Expanded Site Inspection
of the
Miller Chemical & Fertilizer Corporation
(MD-123)

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1.0 Introduction

1.1 Authorization

This Expanded Site Inspection (ESI) was performed by the Maryland Department of the Environment, Waste Management Administration (MDE/WAS), Environmental Restoration and Redevelopment Program (ERRP), Site Assessment Division under the 2002 Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

1.2 Scope of Work

The MDE/WAS ERRP Site Assessment Division was contracted to perform an ESI of the Miller Chemical and Fertilizer Corporation (MD-123). The purpose of the ESI is to assess the site for actual and potential release of arsenic or pesticides in soils of the plant area and the surface water pathway and assess the neighboring Whiteford Packing property as a source for the known contamination of the surface water pathway. The scope of the ESI included sampling of the soil, surface water and sediments under the U.S. EPA Contract Laboratory Program (CLP).

1.3 Executive Summary and Conclusions

Miller Chemical and Fertilizer Corporation, located in Whiteford, Harford County, Maryland, mixed chemicals to produce fungicides and pesticides containing arsenic, copper, chromium and zinc from 1963 through 1965. Waste rinse water from the manufacturing process was discharged to two large drainage ponds that contained waste discharged from the fertilizer manufacturing process. A drainage ditch between the ponds allowed for discharge into the unnamed tributary to Scott Creek. Overflow from the adjacent Whiteford Packing Company, a vegetable processor, also discharged to the drainage ponds and continued to do so after on-site discharge by Miller Chemical and Fertilizer stopped discharging to the ponds in 1976.[1,2,3]

In the 1980s, Miller Chemical & Fertilizer Corp. mixed dry fertilizers to customer specifications and sold a pre-packaged line of herbicides and other farm chemicals that were not blended or packaged on-site. In September 1981, the waste ponds were drained and the land was graded to natural contours. Demolition material from a 2,4-D processing building was used as fill in one pond. The water from the ponds was drained into the nearby creek. Overflow from the adjacent vegetable packing plant continued to discharge to the pond area following drainage of the ponds. The natural contours of the land were preserved during reclamation. Due to the potential for residue from the former pond areas to remain in the area, the filled pond area was designated a non-disturb area and a deed restriction was placed on the 10.38-acre portion of the property restricting it to industrial use.[1,2,3]

The site is currently owned by Trenton Bone Company in care of Lebanon-Seaboard and is managed by Royster-Clark. The plant is currently used for mixing of dry chemicals with water to create liquid fertilizer. No waste is generated in this process.

Two sampling events conducted at this site in 1984 and 2001 have revealed elevated levels of inorganic contamination, especially arsenic, in the stream sediments that exceed the national Oceanic and Atmospheric Agency Screening Quick Reference Table (NOAA SQRT) downstream from the non-disturb area. The April 2001 sampling event also revealed elevated levels of arsenic in the surface water of the stream that exceed the NOAA SQRT levels for freshwater. Soil in the eastern portion of the non-disturb area also contains elevated levels of arsenic compared to background concentrations. The arsenic levels in the soil are below the EPA Risk Based Concentration (RBC) Table screening values for industrial use.[4]

The toxicological evaluation of the 2001 SI data revealed that the estimated non-carcinogenic risk from the ingestion of detected surface soil contaminants exceeds the EPA recommended level for the child visitor and construction worker commercial populations. Dermal contact with detected sediment contaminants exceeded EPA recommended levels of risk for the child visitor commercial population.[4]

Non-carcinogenic risks estimated for the 2001 SI data for the ingestion of detected sediment contaminants exceeded EPA recommended levels of risk for the child visitor and construction worker commercial populations. Dermal contact with detected sediment contaminants exceeded EPA recommended levels of risk for the child visitor commercial population. The estimated carcinogenic risks from ingestion of contaminants in sediment exceeded EPA recommended levels of risk for the child visitor commercial population. Arsenic, copper, nickel, zinc, 4,4'-DDE and 4,4'-DDT exceeded EPA effects range-median values. Copper and dieldrin exceeded either Maryland's ambient water quality standards or EPA recommended ambient water quality criteria for the protection of aquatic life. Arsenic and dieldrin both exceeded EPA recommended water quality criteria for the protection of human health.[4]

In 2002, MDE completed supplemental arsenic sampling of the sediments to identify sources of surface water and sediment arsenic contamination. During this sampling, MDE also collected one surface soil sample from the northern portion of the plant area. The results of this sampling identified elevated levels of arsenic in the sediments in tributaries of the stream from the site and the adjacent Whiteford Packing property. The soil sample collected contained highly elevated arsenic levels. Based on the results of the 2001 SI and supplemental sampling, MDE proposed further investigation into the soil on the plant portion of the site and the surface water and sediments on the site and adjacent properties.[5]

The toxicological evaluation completed for the 2003 ESI data assumed a commercial use for the property. Risk estimates for the incidental ingestion of noncarcinogenic surface soil contaminants for the child visitor and construction worker populations exceeded both MDE and EPA recommended levels. Risk estimates for the

incidental ingestion of detected carcinogenic surface soil contaminants also exceeded MDE recommended levels for the child visitor, youth visitor and adult worker populations. Risk estimates for dermal exposure to detected carcinogenic surface soil contaminants exceeded MDE recommended risk levels for the child visitor commercial population. The carcinogenic risk estimates from incidental ingestion of detected subsurface contaminants exceeded MDE recommended levels for the child visitor commercial population. The risk driver for all scenarios is arsenic.

The risk estimates for incidental ingestion of detected noncarcinogenic sediment contaminants exceeded both MDE and EPA recommended risk levels for the child visitor commercial population. The risk estimated for incidental ingestion of detected carcinogenic sediment contaminants exceeded MDE recommended risk range for the child visitor, youth visitor and adult worker commercial populations. Risk estimates for dermal exposure to detected carcinogenic sediment contaminants exceeded MDE recommended risk levels for the child visitor population. The risk driver for all scenarios is arsenic.

MDE has additional requirements for the site due the presence of elevated levels of arsenic in the soils of the plant area and in the surface water and sediments downstream of the site. Furthermore, the toxicological evaluation suggests risks may be present from exposure to the soils and sediments.

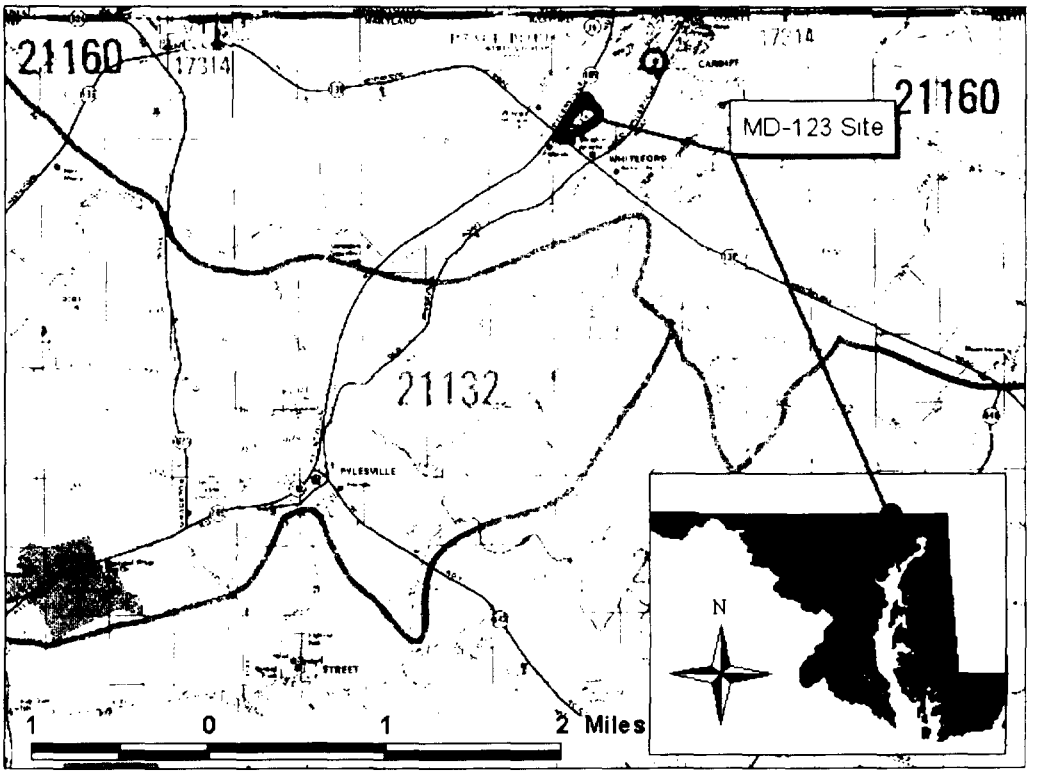
Analytical data from the ESI samples suggests that arsenic soil contamination is present in the northern portion of the plant area above EPA industrial RBC levels and the MDE industrial standards. While there was some evidence of pesticide contamination in the plant area, it appeared to be localized and does not warrant further investigation. Because the southern portion of the plant area was not fully investigated, it is recommended that the entire plant area be investigated using a gridded sampling approach to fully characterize the extent of the arsenic contamination. Furthermore, once the plant area is characterized, it is recommended that monitoring wells be installed and sampled to determine whether the soil contamination has migrated to the groundwater.

2.0 Site Description

The 26-acre Miller Chemical and Fertilizer Corporation property is located at 2425 Whiteford Road in Whiteford, Harford County, Maryland. The Maryland grid coordinates for the site are 685,300 feet north by 983,500 feet east. The geographic coordinates for the site area 39° 42' 47" north by 76° 20' 52" west. The site is situated east of the Whiteford Packing Plant. The two properties are separated by power lines installed along the old Maryland and Pennsylvania Railroad tracks, which are no longer evident. The facility is bounded on the west by MD Route 165 (Pylesville Road), to the south by Whiteford Road (MD Route 136) and to the north by forested land (Figure 1). The tributary to Scott Creek enters the agricultural property after leaving the Miller Chemical property. Two underground drainage pipes enter the site at the southeastern corner of the property. One passes under Whiteford Road and enters the site from

the south and the second enters the site from the east along the north side of Whiteford Road. Land use surrounding the site is primarily residential, with some low-density commercial and light industrial.

Figure 1. Location of the Miller Chemical and Fertilizer Corp. (MD-123) Site

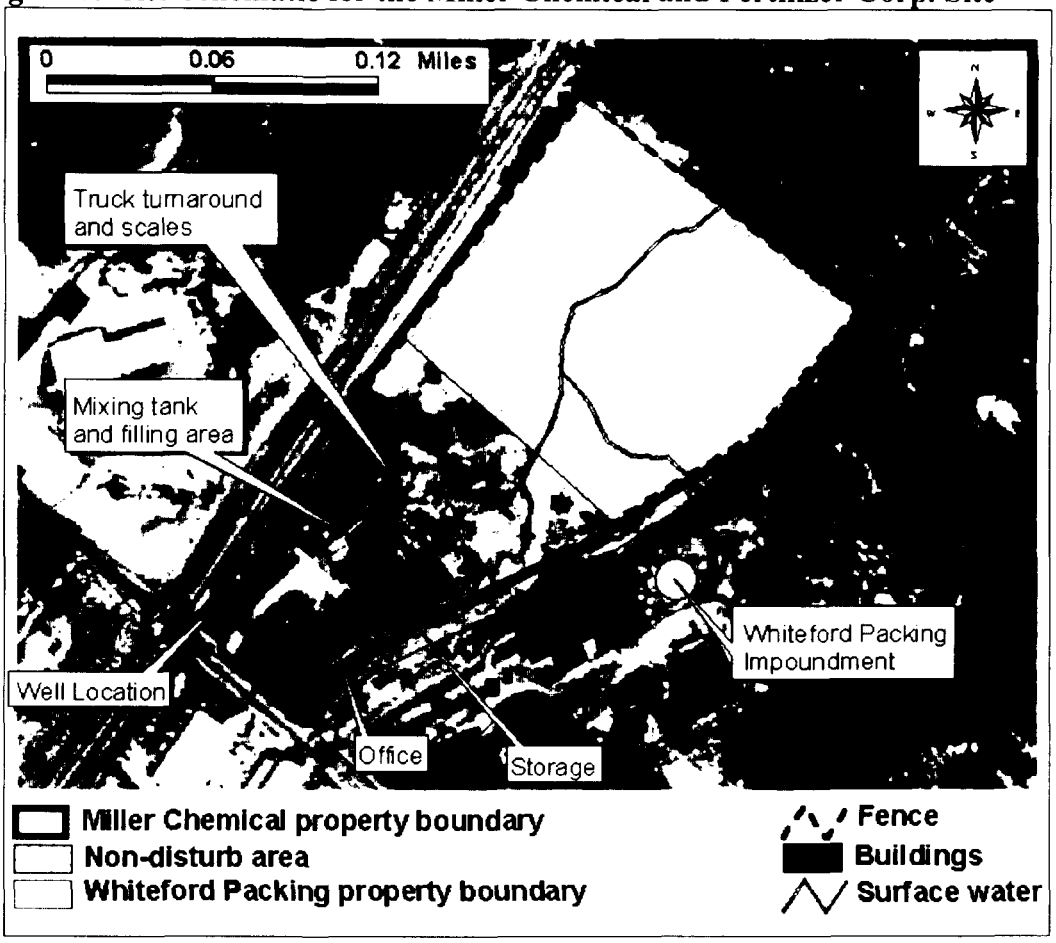


The property has been in use since 1963 as a manufacturer and distributor of pesticides, fertilizers and fungicides. The current owner uses the property for mixing dry chemicals with water to create liquid fertilizer.

The company's parking lots and buildings occupy the southern portion of the property. Until 1981, the northern portion of the property consisted of two large drainage ponds that contained waste discharged from the fertilizer manufacturing process and discharge from the neighboring Whiteford Packing Plant. There is a drainage ditch between the ponds that allowed for discharge into the unnamed tributary to Scott Creek. In 1981, the ponds were drained, the land was re-graded to natural contours and this 10.38-acre portion of the property was designated as a non-disturb area. Overflow from Whiteford Packing continued to discharge to the non-disturb area following their drainage. Pipes installed before 1983 also cross the non-disturb area from Whiteford Packing (Figure 2).

The non-disturb area is currently surrounded by a fence with access restricted to three gates. One gate is located at the southwest corner and two gates are located along the east side. One of the gates on the east side is currently laying on the ground and allows access to the non-disturb area.

Figure 2. Site Schematic for the Miller Chemical and Fertilizer Corp. Site



2.1 Site Ownership and Site Use

In 1958, Miller Chemical and Fertilizer Corporation purchased and installed equipment to mix dry chemical components to produce herbicides and fungicides. The ingredients of these products included arsenic, copper, chromium and zinc. Miller Chemical reported that organic chemicals were not used in this process. The production of these products was a dry process but the mixing tanks were occasionally rinsed with water, which was then discharged to the pond area on the site. The production began in 1963 and ended in 1965. All equipment was removed by 1968. These products were sold under the names 658-Fungicide and Kill-all. The building where these products were manufactured was located on the southern portion of the site near the plant building.[1,2,3]

2,4-D was also blended in a building located on the northern portion of the site near the filled pond area and adjacent to the stream. The only on-site byproduct of this process was the empty drums of 2,4-D, which were resold.[1,2,3]

In the 1980s, Miller Chemical and Fertilizer Corporation mixed dry fertilizers to customer specifications and sold a prepackaged line of herbicides and other farm chemicals that were not blended or mixed on-site.[1,2,3]

The site is currently owned by Trenton Bone Company in care of Lebanon-Seaboard and is managed by Royster-Clark. The site consists of two parcels listed on Harford County Tax Map number 5. The site includes parcels 31 and 274. Parcel 31 contains the plant area and the undeveloped land located to the north of the site that includes the unnamed tributary to Scott Creek. Parcel 274 contains the non-disturb area, which separates the two portions of parcel 31.[6]

The plant is currently used for mixing of dry chemicals with water to create liquid fertilizer. No waste is generated in this process. Chemicals currently stored and mixed on-site include various dry pesticides and herbicides including atrazine and a mixture of sulfuric and phosphoric acid. Water for this process is supplied from an on-site well located on the southwest corner of the property and is stored in plastic tanks located on the west side of the parking lot.

The non-disturb area is surrounded by a fence and access is restricted to three gates. During the sampling even on April 3, 2003 MDE personnel observed that one of the gates located on the east side of the property had been knocked down and allowed easy access. Pipes cross the non-disturb area from the Whiteford Packing property and discharge on the west side of MD Route 165. These pipes are not in use because Whiteford Packing has ceased all operations.

During a site visit in April 2001, MDE personnel observed a tree stand for deer hunting located along the tributary to Scott Creek located north of the non-disturb area on the northern portion of parcel 31, indicating that the area is also used for recreational purposes.

2.2 Permitting and Regulatory Actions

In 1981, the Maryland Department of Health and Mental Hygiene (DHMH) required Miller Chemical and Fertilizer to obtain a State hazardous waste permit for the operation and maintenance of the ponds because the company discharged process waste to the ponds. Following issuance of the permit, the property owners drained the ponds and the land was re-graded to natural contours in September 1981. DHMH discontinued Miller Chemical and Fertilizer Corporation's hazardous waste permit A-015 in September 1982 because the facility no longer discharged hazardous waste into the ponds.[1,2,3,6,7]

2.3 Remedial Actions

In September 1981, the waste ponds were drained and the land was graded to natural contours. The demolition material from the 2,4-D processing building was used as fill in one pond. The water from the ponds was drained into the nearby creek. The natural contours of the land were preserved during reclamation. The filled pond area was designated a non-disturb area and a deed restriction was placed on this portion of the property restricting it to industrial use.[1,2,3]

3.0 Environmental Setting

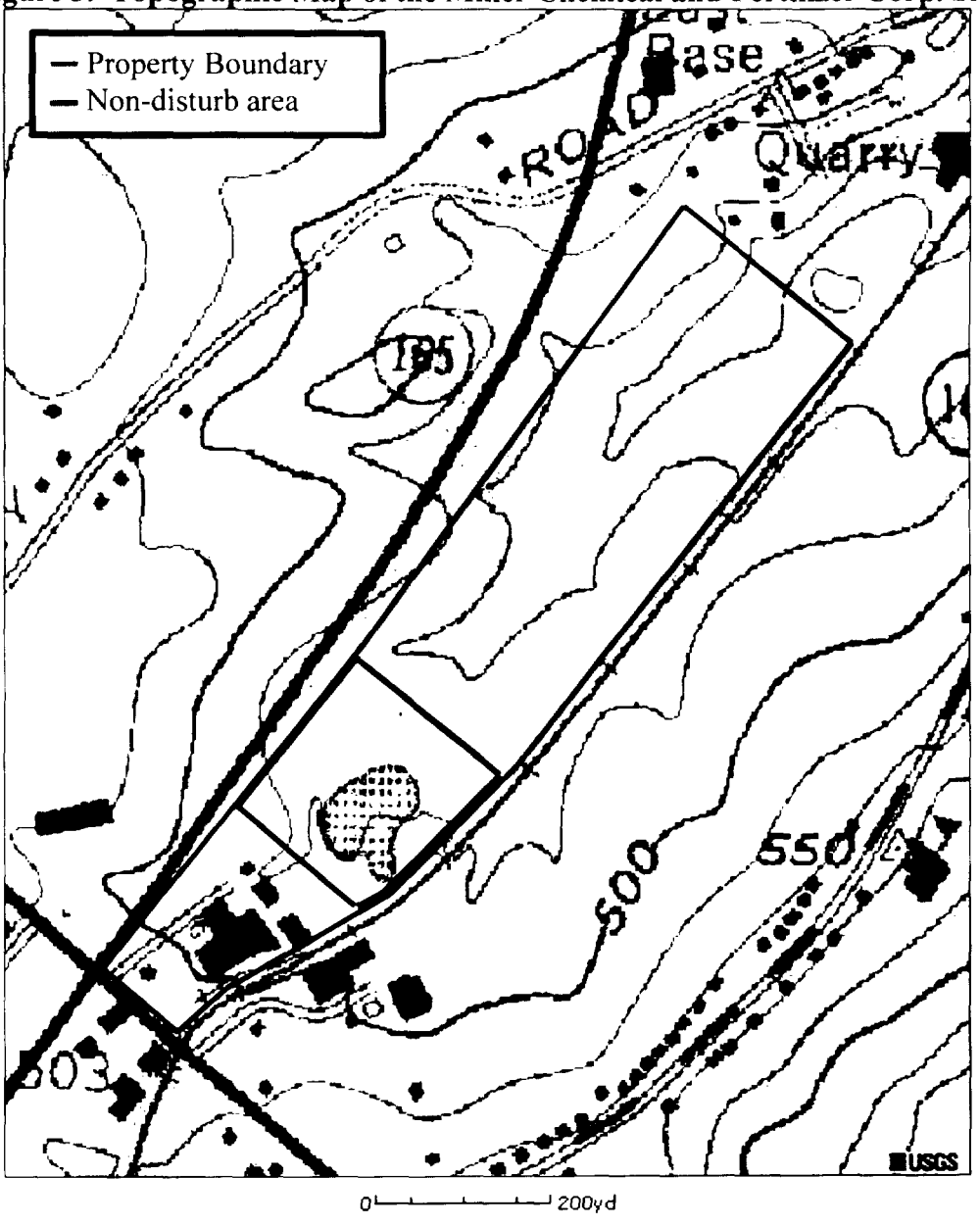
3.1 Water Supply

(b) (8) [redacted]

3.2 Surface Waters

Natural drainage of on-site surface water and overland flow is from south to north (Figure 3). The plant and parking areas are raised in elevation and slope toward the non-disturb area. Surface runoff from the plant area appears to run into the drainage ditch. The non-disturb area is drained by the ditch to the unnamed tributary to Scott Creek located to the north of the site. The drainage ditch becomes perennial approximately 90 feet north of the fence. Surface water either collects in the non-disturb area or is discharged to the unnamed tributary to Scott Creek via the drainage ditch. Scott Creek extends north over the state line to Pennsylvania where it eventually empties into the Susquehanna River.[8]

Figure 3. Topographic Map of the Miller Chemical and Fertilizer Corp. Site



The farthest upstream probable point of entry for the surface water route originates at the on-site drainage ditch in the southern portion of the non-disturb area where a perched layer of groundwater flows into the stream bed at a volume to maintain water in the streambed. However, upstream of the PPE groundwater was also visible flowing from the wall of the stream bed and collecting in unconnected shallow pools of water. After the PPE, the drainage ditch travels north for approximately 0.16 miles before emptying into the tributary to Scott Creek. The non-disturb area is classified as Palustrine flat wetlands. Scott Creek flows north-northeast for approximately 7.0 miles before emptying into the Susquehanna River. While on-site, the tributary of Scott Creek travels through Palustrine Forested and Palustrine Emergent wetlands. In the last 4 miles before it empties into the Susquehanna River, Scott Creek is classified as Riverine Upper

Perennial and Riverine Lower Perennial wetlands. From this juncture, the Susquehanna River flows south and the 15-mile surface migration pathway ends about 7.84 miles downstream. The Susquehanna is classified as Lacustrine Limnetic wetlands and is a fishery.

3.3 Soils

The non-disturb area is located on Baile silt loam from the Whiteford Association with a 3 to 8% slope. This soil type is characterized by moderately slow to slow permeability and takes up water very slowly, causing most rainfall to run off. The plant area is located on the moderately eroded Chester silt loam from the Manor-Glenelg Association with a 3 to 8% slope. This soil type is deep and well drained with moderate permeability and a high available water capacity. Geoprobe cores from both the non-disturb area and the plant area indicate that the site is located on a layer of saprolite rich in schist.[11,12,13]

3.4 Geology

The site is located in the Piedmont plateau province in an outcrop of Peach Bottom slate. The Peach Bottom slate is a hard, bluish-black graphitic slate with thin beds of fine-grained black quartzite near the base. The apparent maximum thickness is 1,000 feet. The site is located near the axis of the Peach Bottom Syncline.[14]

3.5 Groundwater

Groundwater was not investigated during the ESI; however, during the 2001 SI shallow groundwater was not encountered at the site in Geoprobe borings up to 27 feet in depth. A review of residential well logs within 0.5 mile of the site indicates that only one well has a top screen located at a depth of less than 30 feet. The average depth of the top screen for the wells is 101.8 feet. According to Mr. Ben Hushon, the site manager during the 2001 SI, the on-site well located at the southwest corner of the property is approximately 75 to 100 feet deep but there are no records to confirm this.[7]

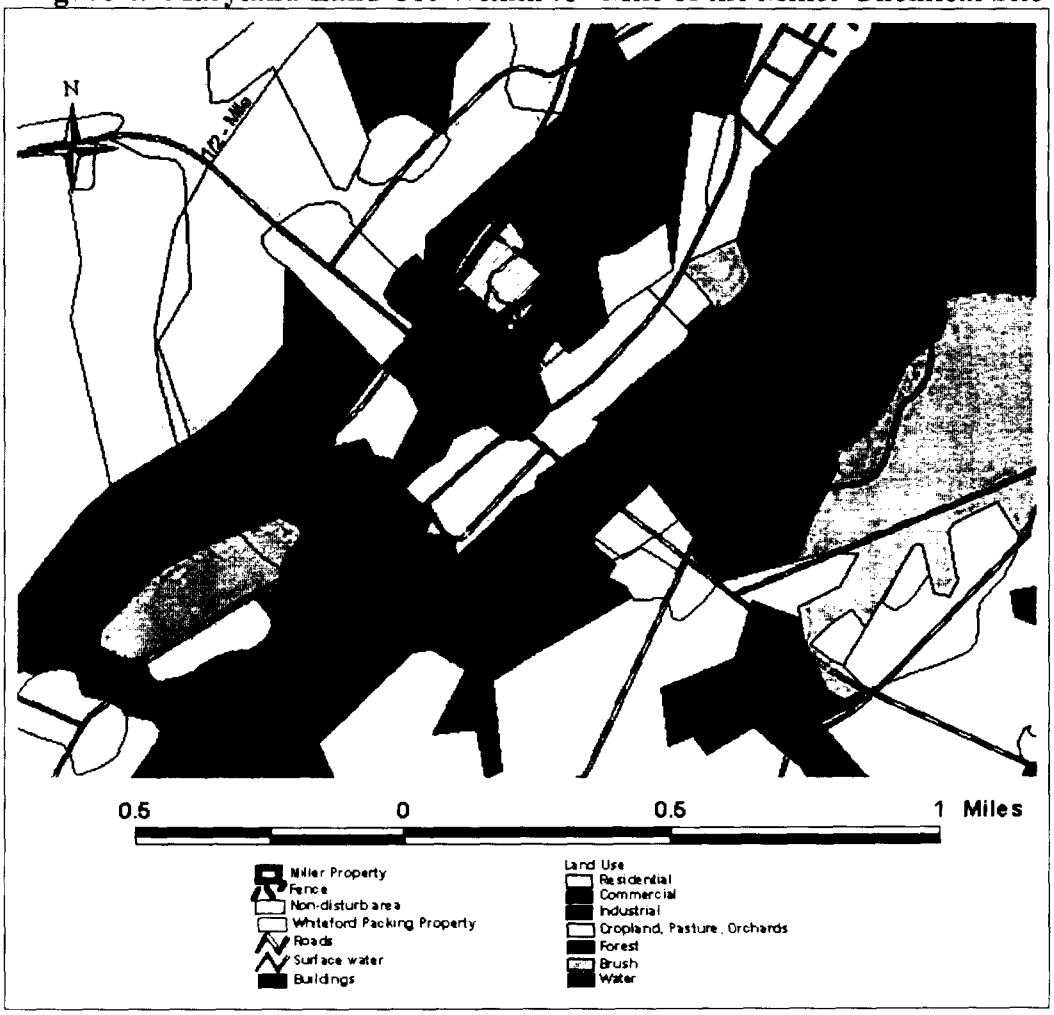
3.6 Meteorology

The climate is temperate and humid. The mean annual temperature is about 53 degrees Fahrenheit and mean annual precipitation is about 43 inches.[15]

3.7 Nearby Land Use and Population Distribution

Land use surrounding the site is primarily forest and cropland with some residential, low-density commercial and light industrial in the area (Figure 4). The commercial areas are primarily located along Routes 136 and 165. The Whiteford Packing property located west of the site is light industrial. Whiteford Packing was a seasonal vegetable packing company that has recently ceased operating and had their discharge permit revoked. While the packing plant is no longer operating, there is signage to indicate the presence of an ice cream shop. A small commercial shopping plaza is located across from the site.

Figure 4. Maryland Land Use Within ½ - Mile of the Miller Chemical Site



The population distribution around the site was determined using 2000 Census data. The population in Maryland was calculated using block group data and the population in Pennsylvania was estimated using the average population density for York County. Within a 0.25-mile radius of the site, there are approximately 77 residents. Within a 0.25 to 0.5 mile radius, the resident population is approximately 178. Within a 0.5 to 1.0 mile radius, there are approximately 691 residents. Approximately 2690 people reside within a 1.0 to 2.0 mile radius of the site. Within a 2.0 to 3.0 mile radius, there are approximately 4457 residents. Within a 3.0 to 4.0 mile radius of the site, the resident population is approximately 6183.[17]

4.0 Waste Description

The pesticides and fungicides named 658-Fungicide and Kill-all produced by Miller Chemical between 1963 and 1965 contained arsenic, copper, chromium and zinc. The mixing tanks were occasionally rinsed with water, which was then discharged to a pond area on the site. 2,4-D was also blended on the northern portion of the site near the filled pond area and adjacent to the stream. The empty drums of 2,4-D generated during this process were resold.[1,2,3]

5.0 Previous Studies

Prompted by national concern for dioxin contamination after an incident in Times Beach, Missouri, DHMH proposed the Miller Chemical and Fertilizer site for further study based on the historical manufacture of 2,4-D. The NUS Corporation conducted a site inspection and sampling event on June 22, 1983. The Field Trip Report for Miller Chemical and Fertilizer Corporation and an Addendum to the Final Field Trip Report for Miller Chemical and Fertilizer was completed in 1985. The field trip report summarized a site inspection, which included dioxin (2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)) screening and historical information. Analysis of samples revealed dioxin contamination in the area of the background samples taken off-site, north of the 2,4-D handling building. This was confirmed by analysis of the samples by a second laboratory. Also found in the area of the 2,4-D handling building were two semi-buried vaults containing explosives. The addendum provided an analysis of priority pollutant sampling and concludes that sediments downstream of the site have elevated levels of arsenic, lead, and polynuclear aromatic compounds (PAHs).[1,2]

On October 18, 1983, NUS Corporation conducted a site visit and sampling event for a Field Trip Report for Miller Chemical and Fertilizer Company, which was submitted to EPA in 1984. The report provided a Phase II investigation of the extent of known 2,3,7,8-TCDD contamination adjacent to the site. It was determined that the contamination was localized and related to an adjacent rail spur. The maximum concentration was 1.76 parts per billion, which was well below the standard for industrial use. As a result, the Department of Health and Human Services stated that these levels did not represent a significant public health threat as long as the property use remained industrial.[3]

In 2001, MDE completed a Site Inspection that identified elevated levels of arsenic in the soils in some portions of the non-disturb area and elevated levels of arsenic in the surface water and sediment of the tributary to Scott Creek. The investigation also identified the adjacent Whiteford Packing property as a possible source of the arsenic in the stream. MDE recommended further investigation of the surface water and groundwater pathways.[4]

In 2002, MDE conducted a Supplementary Sampling event to identify whether arsenic was present in the branches of the stream entering the site from adjacent properties. The sample results suggested that the adjacent Whiteford Packing property may have been contributing to the arsenic contamination in the stream. An additional soil sample collected from the northern edge of the plant area also indicated that soil in the plant area may also be of concern. Based on the results of the supplementary sampling and the SI, MDE recommended further investigation of the site.[5]

6.0 MDE Contract Laboratory Program (CLP) Sampling

As a follow up to the 2001 SI and 2002 Supplementary Sampling, MDE proposed a resampling of the Miller Chemical site to EPA in Fiscal Year 2003. Accordingly, a sampling plan proposal was submitted to the EPA Region III office on February 26, 2003 for the proposed collection of surface water, sediment and soil at the site. The purpose of the sampling was to evaluate areas near the plant buildings and identify the source of arsenic contamination in the tributary to Scott Creek. EPA approved the sampling proposal on March 12, 2003.

MDE personnel conducted the sampling on April 3, 2003 according to procedures outlined in EPA's CLP Routine Analytic Services as Case Number 31571. All samples were analyzed for arsenic and pesticides (Appendix I). MDE collected the samples in four matrices: one organic aqueous, one organic solid, one inorganic aqueous, and one inorganic solid. Sampling procedures for surface water, sediment and soil are outlined in MDE's Standard Operating Procedures. Each matrix included the collection of a field duplicate sample and a matrix spike sample. A field blank consisting of deionized water prepared by MDE was provided for each aqueous matrix. The inorganic samples were submitted to the Chemtech Consulting Group for analysis under the CLP. The organic samples were submitted to the Ceimic Corporation for analysis under the CLP. The sampling locations are shown in Figure 5 and the sampling summary table is shown in Table 2 on the following page.

Figure 5. ESI Sample Locations at Miller Chemical and Fertilizer Corp. (MD-123)

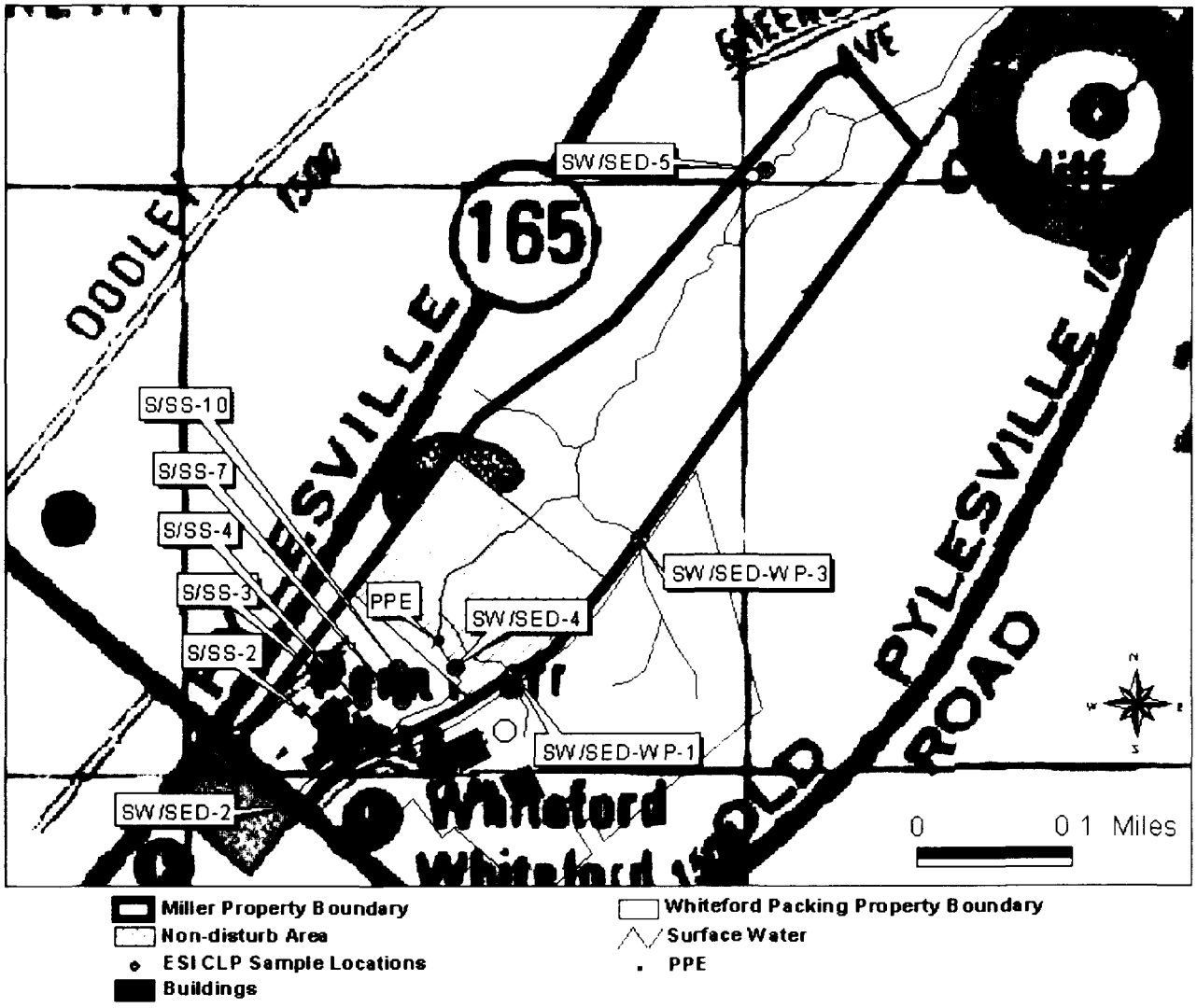


Table 2. ESI Sample Summary for Miller Chemical and Fertilizer Corp. (MD-123)

Sampling Point	Location	Rationale
S2	South of plant building. Surface soil.	Identify surface contamination near the plant.
SS2	South of plant building. Subsurface soil.	Identify subsurface contamination near the plant.
S3	Northwest of plant building. Surface sample.	Identify surface contamination near the plant.
SS3	Northwest of plant building. Subsurface sample.	Identify subsurface contamination near the plant.
S4	North of the plant building. Surface sample.	Identify surface contamination near the plant.
SS4	North of the plant building. Subsurface sample.	Identify subsurface contamination near the plant.
S7	North and downgradient of the plant building. Surface sample.	Identify any surface contamination downgradient of the plant area.
SS7	North and downgradient of the plant building. Subsurface sample.	Identify any subsurface contamination downgradient of the plant area.
S10	North and downgradient of the plant building. Surface sample.	Identify any surface contamination downgradient of the plant area.
SS10	North and downgradient of the plant building. Subsurface sample.	Identify any subsurface contamination downgradient of the plant area.
SW-1	Drainage ditch as it enters the site.	Identify any contamination entering the site (Background).
SED-1	Drainage ditch as it enters the site.	Identify any contamination entering the site (Background).
SW-3	Stream immediately downstream of the plant building. **Not collected because of dry stream.**	Identify whether the plant building is a source of contamination.
SED-3	Stream immediately downstream of the plant building. **Not collected because of dry stream.**	Identify whether the plant building is a source of contamination.
SW-4	Stream at the southern edge of the non-disturb area.	Identify whether contamination is entering the stream upgradient of the non-disturb area.
SED-4	Stream at the southern edge of the non-disturb area.	Identify whether contamination is entering the stream upgradient of the non-disturb area.
SW-5	Stream at the very northern site boundary.	Identify the extent of contamination.
SED-5	Stream at the very northern site boundary.	Identify the extent of contamination.
SW/WP1	Stream located north of the Whiteford Packing Plant building.	Identify whether contamination is entering the site from the Whiteford Packing Property.
SED/WP1	Stream located north of the Whiteford Packing Plant building.	Identify whether contamination is entering the site from the Whiteford Packing Property.
SW/WP3	Stream located on the Whiteford Packing Property. **Not analyzed because bottleware broke during shipment.**	Identify whether contamination is entering the site from the Whiteford Packing Property.
SED/WP3	Stream located on the Whiteford Packing Property.	Identify whether contamination is entering the site from the Whiteford Packing Property.

6.1 Surface Water/Sediment Sampling Results

MDE collected six surface water (including one duplicate) and five sediment grab samples. The sediment sample locations were coincident with the surface water sampling locations. The chemicals in the surface water and sediment samples were screened against the Maryland Water Quality Criteria values and National Oceanic and Atmospheric Administration, *Screening Quick Reference Tables* (NOAA SQRT) values for freshwater and freshwater sediment and the Region III Biological Technical Advisory Group (BTAG) Flora.[17, 18]

Sample results revealed elevated levels of arsenic contamination in the surface water and sediments downstream of the site (See Table 3 and 4). Arsenic contamination in the tributary to Scott Creek is attributable to the Miller site; however, the adjacent Whiteford Packing Company property has not been ruled out as a historic source. Samples collected from downgradient of the plant area where surface water appeared to be entering the stream bed via a perched layer beneath the plant (samples SW4 and SED4) showed levels of arsenic greater than 100 times background levels but not greater than either the Region III BTAG Flora and NOAA SQRT "chronic" standards. While the surface water from the tributaries originating from Whiteford Packing showed no arsenic contamination (samples SW/WP3), the sediment samples showed levels of arsenic above background (samples SEDWP1 and SEDWP3). Samples collected at the northern (downgradient) property boundary (sample SW5 and SED5) show that levels of arsenic are elevated above background but have decreased by approximately half when compared to the samples (SW4 and SED4) collected from the non-disturb area.

Table 3. Summary of Arsenic Detected in Surface Water

Analyte (ug/L)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ARSENIC	48 (Ar^{+5})	150	<15	172	52.1	3.9 J	4.4 J	<15	<15

J = Analyte present. Reported value may not be accurate or precise. Yellow highlighted values are either three times background levels or are detected in the sample but not in the background and exceed a standard. Values in red exceed a standard.

Table 4. Summary of Arsenic Detected in Sediment

Analyte (mg/kg)	[illegible]	[illegible]	[illegible]	SED4	SED5	SEDWP1	SEDWP3
ARSENIC	0.057 (Ar^{+3})	5.9	2.3 J	333	143	32.2	9.4

J = Analyte present. Reported value may not be accurate or precise. Yellow highlighted values are either three times background levels or detected in the sample but not in the background and exceed a standard. Values in red exceed a standard.

Sample results reveal no pesticide contamination in the surface water and little pesticide contamination in the sediments (See Table 5). The only sediment sample containing detectable levels of pesticides (SED5) was collected adjacent to a farm field. The upstream sample (SED4) collected near the plant area showed no detectable pesticides.

Table 5. Summary of Pesticides Detected in Sediment Samples

	[redacted]	[redacted]	[redacted]	[redacted]
4,4'-DDT	<3.9	<4.4	**9.1**	<4.3
DIELDRIN	<3.9	<4.4	**7.6 J**	<4.3
GAMMA-CHLORDANE	<2.0	<2.3	**3.4 J**	<2.2

J = Analyte present. Reported value may not be accurate or precise. Yellow highlighted values are either three times background levels or are detected in the sample but not in the background and exceed a standard. Values in red exceed a standard.

6.2 Soil Sampling Results

MDE collected twelve soil grab samples (including two duplicates) from Geoprobe cores. Surface soil samples were collected at a depth of zero to one foot and subsurface soil samples were collected at five to six feet. The chemicals in the soil samples were screened against the MDE non-residential standard and the EPA Industrial Risk Based Concentration (RBC).[19,20]

Sample results revealed the presence of surface and subsurface arsenic contamination in the plant area (Table 6). Samples near the plant buildings (S2, S4, S10, S11, SS3 and SS10) showed levels of arsenic above background levels and that also exceeded both the MDE non-residential standard and the EPA Industrial RBC. While arsenic was also detected in the background sample (S11 from the 2001 SI), the contamination in the plant area is attributable (greater than three times background) to the Miller site. In most sampling locations (S/SS2, S/SS4 and S/SS10) the surface contamination was greater than the subsurface contamination.

Table 6. Summary of Inorganic Detection in Soil Samples

[redacted]	MDE Non-Res Std	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
ARSENIC	3.8	1.9	4.9 L	17.2	8	67.2	13.2	92	15.1	5.1	22.4	10.5	5.5	27.2	4.7

L = Analyte present. Reported value may be biased low. Reported value may not be accurate or precise. Yellow highlighted values are either three times background levels or are detected in the sample but not in the background and exceed a standard. Values in red exceed a standard.

Sample results revealed pesticide contamination in the surface and subsurface soils (Table 7). Samples near the plant buildings (S2, S3, S4, S10, S11, SS3 and SS4) showed levels of pesticides above background levels and that also exceeded both the MDE non-residential standard and the EPA Industrial RBC. The highest concentrations of arsenic appear to occur in the sample locations immediately adjacent to the plant building (S/SS2, S/SS3 and S/SS4).

Table 7. Summary of Pesticide Detection in Soil Samples

[redacted]	MDE Background	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
4,4'-DDD	24000	12000	<4.2	<3.6	**4**	**7.6 J**	<3.3	**330**	<3.6	<4.2	<4.1	<4.1	<4.2	<4.2	<4.3
4,4'-DDE	17000	8400	<4.2	**23**	**11**	**23**	<3.3	**33 J**	**21**	<4.2	<4.1	<4.1	<4.2	<4.2	<4.3
4,4'-DDT	17000	8400	<4.2	**100**	**52**	**130**	<3.3	**47 J**	**110**	<4.2	<4.1	<4.1	<4.2	<4.2	<4.3
ALPHA-CHLORDANE	16000	8200*	<2.2	**7.9**	**2.8**	**3.5**	<1.8	**54**	**7.2**	<2.1	<2.1	<2.1	<2.1	<2.2	<2.2
DIELDRIN	360	180	<4.3	**140**	**37**	**56**	<3.3	**31 J**	160	<4.2	**12**	<2.1	<4.2	<4.2	<4.3
GAMMA-CHLORDANE	--	8200*	<2.2	**73**	**17**	**17**	<1.8	**490**	75	<2.1	<2.1	<2.1	<2.1	<2.2	<2.2
HEPTACHLOR	1300	640	<2.2	**45**	<2.0	**2**	<1.8	**530**	49	<2.1	<2.1	<2.1	<2.1	<2.2	<2.2
HEPTACHLOR EPOXIDE	630	310	<2.2	**7.5**	**7.7**	<1.8	<1.8	**240**	8.1	<2.1	<2.1	<2.1	<2.1	<2.2	<2.2

J = Analyte present. Reported value may not be accurate or precise. Yellow highlighted values are either three times background levels or are detected in the sample but not in the background [redacted] standard. Values in red exceed a standard. An asterisk indicates that the standard is for Chlordane.

7.0 Toxicological Evaluation

A toxicological evaluation of the Miller Chemical and Fertilizer Corp. site was completed by MDE for a commercial use scenario (Appendix C). The evaluation was based on the data obtained from the April 3, 2003 sampling event. The toxicological evaluation estimated the noncarcinogenic and carcinogenic risks to child intermittent visitor, youth intermittent visitor, adult worker and construction worker populations under a commercial use scenario.

As a safety precaution, the toxicological evaluation was prepared using many conservative assumptions. For example, the evaluation assumed people would be exposed to the maximum contaminant concentrations at the site for the entire exposure duration. It did not take into account whether the maximum concentrations were anomalous or characteristic of the site or whether biodegradation, dispersion, dilution or other factors may decrease these concentrations during the time of exposure. Each contaminant was assumed to have a bioavailability of 100 percent, implying that all of the contaminants taken into the body are absorbed across the digestive tract. Given the use of these conservative assumptions in the evaluation, it is important to recognize that a calculated risk exceeding the EPA recommended level of risk does not necessarily indicate an increased risk to human health.

EPA recognizes an acceptable Hazard Index of values less than or equal to 1 (noncarcinogenic chemicals) and a lifetime cancer risk less than or equal to 10^{-6} to 10^{-4}. MDE recognizes threshold Hazard Index values equal to 1 and lifetime cancer risk threshold values less than or equal to 10^{-5}.

Surface and subsurface soil contamination were evaluated for ingestion, inhalation and dermal contact for non-carcinogenic and carcinogenic risks for both detected and non-detected contaminants. Risk estimates for the incidental ingestion of noncarcinogenic surface soil contaminants for the child visitor and construction worker populations exceeded both MDE and EPA recommended levels. Risk estimates for the incidental ingestion of detected carcinogenic surface soil contaminants also exceeded MDE recommended levels for the child visitor, youth visitor and adult worker populations. Risk estimates for dermal exposure to detected carcinogenic surface soil contaminants exceeded MDE recommended risk levels for the child visitor commercial population. The carcinogenic risk estimates from incidental ingestion of detected subsurface contaminants exceeded MDE recommended levels for the child visitor commercial population. The risk driver for all scenarios is arsenic.

Sediment contamination was evaluated for ingestion, inhalation and dermal contact for non-carcinogenic and carcinogenic risks for both detected and non-detected contaminants. The risk estimates for incidental ingestion of detected noncarcinogenic sediment contaminants exceeded both MDE and EPA recommended risk levels for the child visitor commercial population. The risk estimated for incidental ingestion of detected carcinogenic sediment contaminants exceeded MDE recommended risk range for the child visitor, youth visitor and adult worker commercial populations. Risk estimates for dermal exposure to detected carcinogenic sediment contaminants exceeded MDE recommended risk levels for the child visitor population. The risk driver for all scenarios is arsenic.

Surface water contamination was evaluated for adult, child and youth recreational swimmers from the incidental ingestion of surface water contaminants while swimming. The estimated risks for all populations were within EPA recommended levels of risk. However, arsenic exceeded EPA recommended human health ambient water quality criteria for fish consumption.

8.0 References

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18. the Region III Biological Technical Advisory Group Screening Levels, 1995.
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20. U.S. Environmental Protection Agency, *Risk-Based Concentration Tables*, Region III, May 2001.
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Appendix I

TARGET ANALYTE LIST

INORGANICS

Aluminum	Cobalt	Nickel
Antimony	Copper	Potassium
Arsenic	Cyanide	Selenium
Barium	Iron	Silver
Beryllium	Lead	Thallium
Cadmium	Magnesium	Sodium
Calcium	Manganese	Vanadium
Chromium	Mercury	Zinc

TARGET COMPOUND LIST

VOLATILES

Acetone	Chloromethane	Styrene
Benzene	1,1-Dichloroethane	1,1,2,2-Tetrachloroethane
Bromodichloromethane	1,2-Dichloroethane	Tetrachloroethene
Bromoform	1,1-Dichloroethene	Toluene
Bromomethane	total-1,2-Dichloroethene	1,1,1-Trichloroethane
2-Butanone	1,2-Dichloropropane	1,1,2-Trichloroethane
Carbon Disulfide	cis-1,2-Dichloropropene	Trichloroethene
Carbon Tetrachloride	trans-1,3-Dichloropropene	Vinyl acetate
Chlorodibromomethane	Ethylbenzene	Vinyl chloride
Chlorobenzene	2-Hexanone	Xylene (total)
Chloroethane	Methylene Chloride	
Chloroform	4-Methyl-2-Pentanone	

TARGET COMPOUND LIST

SEMIVOLATILES

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i) perylene
Benzoic Acid
Benzyl alcohol
Bis(2-chloroethyl)ether
Bis(2-chloroethoxy)methane
Bis(2-chloroisopropyl)ether
Bis(2-Ethylhexyl) phthalate
4-Bromophenyl phenyl ether
Butylbenzylphthalate
4-Chloroaniline
4-Chloro-3-methylphenol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenol phenyl ether
Chrysene
Dibenzo(a,h)anthracene
Dibenzofuran
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3-3-Dichlorobenzidine
2,4-Dichlorophenol
Diethyl phthalate
2,4-Dimethylphenol
Di-n-butylphthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Dimethylphthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd) pyrene
Isophorone
2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Naphthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
2-Nitrophenol
4-Nitrophenol
N-Nitrosodiphenylamine
N-Nitroso-di-n-propylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

TARGET COMPOUND LIST

PESTICIDES AND PCBS

Aldrin
alpha-BHC
beta-BHC
gamma-BHC (Lindane)
delta-BHC
alpha-Chlordane
gamma-Chlordane
4,4-DDT
4,4-DDE
4,4-DDD
Dieldrin
Endosulfan
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Endrin ketone
Heptachlor
Heptachlor epoxide
Methoxychlor
PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248
PCB-1254
PCB-1260
Toxaphene

Appendix A Inorganic Data Package and QA/QC Review.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
701 MAPES ROAD
FORT MEADE, MD 20755-5350

DATE : May 20, 2003

SUBJECT: Region III Data QA Review

FROM : Fredrick Foreman
Region III ESAT RPO (3ES20)

TO : Lorie Baker
Regional Project Manager (3HS34)

Attached is the inorganic data validation report for the Miller Chemical/Fertilizer Corp. site (Case #: 31571, SDG#: MC01C1, MC01E4) completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III ESD.

If you have any questions regarding this review, please call me at (410) 305-2629.

Attachments

cc: Chris Hartman (MDE)

TO File #: 0011 TDF#: 0509

ANALYTICAL SERVICES AND QUALITY ASSURANCE BRANCH

Lockheed Martin Environmental Services
US EPA Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Telephone 410-305-3037 Facsimile 410-305-3597

LOCKHEED MARTIN

DATE: May 14, 2003

SUBJECT: Inorganic Data Validation (Level IM2)
Site: Miller Chemical / Fertilizer Corp.
Case: 31571 SDGs: MC01C1; MC01E4

FROM: Lisa D. Penix
Inorganic Data Reviewer

Mahboobeh Mecanic
Senior Oversight Chemist

TO: Fredrick Foreman
ESAT Region 3 Project Officer

OVERVIEW

Case 31571, Sample Delivery Groups (SDGs) MC01C1 & MC01E4, from the Miller Chemical / Fertilizer Corp. site consisted of seven (7) aqueous samples and seventeen (17) soil samples analyzed for arsenic by Chemtech (CHEM). The sample set contained one (1) field blank and three (3) field duplicate pairs. Samples were analyzed in accordance with Contract Laboratory Program (CLP) Statement of Work (SOW) ILM05.2 through Routine Analytical Services (RAS) program.

SUMMARY

All samples were successfully analyzed for the requested parameter.

NOTES

Values reported between the Method Detection Limit (MDL) and Contract Required Quantitation Limit (CRQL) are qualified "J" on the DSFs.

The reported results in the field duplicate pairs, samples MC01C2 & MC01C3; MC01D7 & MC01D8; and MC01E5 & MC01F0 , were all comparable.

Data for Case 31569, SDG MC0033, were reviewed in accordance with EPA Region 3 Modifications to the Inorganic National Functional Guidelines, April 1993.

ATTACHMENTS

APPENDIX A	GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)
APPENDIX B	DATA SUMMARY FORMS
APPENDIX C	CHAIN OF CUSTODY (COC) RECORDS
APPENDIX D	LABORATORY CASE NARRATIVES

Appendix A

Glossary of Data Qualifier Codes

GLOSSARY OF DATA QUALIFIER CODES

CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of analytes):

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte Present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

Q = No analytical result.

Appendix B

Data Summary Forms

DATA SUMMARY FORM: INORGANIC (Qualified Results)

Case #: 31571 SDG : MC01C1 Number of Soil Samples : 17
Site : MILLER CHEMICAL/FERTILIZER CORP Number of Water Samples : 0
Lab. : CHEM

Sample Number :		MC01C1		MC01C2		MC01C3		MC01C4		MC01C5	
Sampling Location :		S10		S11 DUP MC01C3		S2 DUP MC01C2		S3		S4	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		11:30		12:20		12:20		08:45		11:00	
%Solids :		66.6		91.7		91.8		85.4		92.4	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ARSENIC	3	92.0		15.1		17.2		8.0		67.2	

CRDL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) / (%Solids/ 100) Revised 09/99

Sample Number :		MC01C6		MC01C7		MC01D0		MC01D1		MC01D2	
Sampling Location :		S7		SED1		SED4		SED5		SEDWP1	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		11:55		11:40		12:55		09:25		10:40	
%Solids :		78.6		81.3		71.1		52.8		69.1	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ARSENIC	3	13.2		2.3	J	333		143		32.2	

CRDL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) / (%Solids/ 100) Revised 09/99

Sample Number :		MC01D4		MC01D6		MC01D7		MC01D8		MC01D9	
Sampling Location :		SEDWP3		SS10		SS11 DUP MC01D8		SS2 DUP MC01D7		SS3	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		09:55		11:35		12:35		12:35		08:50	
%Solids :		73.0		77.9		77.8		77.4		76.2	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ARSENIC	3	9.4		27.2		4.7		5.1		22.4	

CRDL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) / (%Solids/ 100) Revised 09/99

Sample Number :		MC01E0		MC01E1							
Sampling Location :		SS4		SS7							
Matrix :		Soil		Soil							
Units :		mg/Kg		mg/Kg							
Date Sampled :		04/03/2003		04/03/2003							
Time Sampled :		11:05		12:05							
%Solids :		79.6		76.8							
Dilution Factor :		1.0		1.0							
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ARSENIC	3	10.5		5.5							

CRDL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) / (%Solids/ 100) Revised 09/99

Case #: 31571 SDG : MC01E4 Number of Soil Samples : 0
Site : MILLER CHEMICAL/FERTILIZER CORP Number of Water Samples : 7
Lab. : CHEM

Sample Number :		MC01E4		MC01E5		MC01E8		MC01E9		MC01F0	
Sampling Location :		SW/WP3		SW1 DUP MC01F0		SW4		SW5		SW6 DUP MC01E5	
Matrix :		Water		Water		Water		Water		Water	
Units :		ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		09:55		11:30		12:55		09.20		11:30	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
*ARSENIC	15					172		52.1		3.9	J

CRDL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) Revised 09/99

Sample Number :		MC01F1		MC01F2							
Sampling Location :		SW7 Field Blank		SW/WP1							
Matrix :		Water		Water							
Units :		ug/L		ug/L							
Date Sampled :		04/03/2003		04/03/2003							
Time Sampled :		12:00		10:40							
Dilution Factor :		1.0		1.0							
ANALYTE	CRDL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
*ARSENIC	15			4.4	J						

CRDL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRDL * Dilution Factor) Revised 09/99

Appendix C

Chain-of-Custody Records

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 31571
DAS No:
R

Region:	3	**Date Shipped:**	4/3/2003	**Chain of Custody Record**	**Sampler Signature:**
Project Code:	MD-123	**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:	03TO3W50102DA3DA3D8LA00	**Airbill:**	819742448310	1	
CERCLIS ID:	MDD053948188	**Shipped to:**	Chemtech Consulting Group (CHEM) 284 Sheffield Street Mountainside NJ 07092 (908) 789-8900	2	
Spill ID:	A3D8			3	
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M			4	
Project Leader:	Richelle Hanson				
Action:	Expanded Site Investigation/RI				
Sampling Co:	MDE				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MC01C1	Soil (>12")/ Scott Morgan	L/G	As (21)	1002 (Ice Only) (1)	S10	S: 4/3/2003	11:30	C01C1	MS/MSD
MC01C2	Soil (>12")/ Scott Morgan	L/G	As (21)	1004 (Ice Only) (1)	S11	S: 4/3/2003	12:20	C01C2	Field Duplicate
MC01C3	Soil (>12")/ Scott Morgan	L/G	As (21)	1006 (Ice Only) (1)	S2	S: 4/3/2003	12:20	C01C3	--
MC01C4	Soil (>12")/ Brian Dietz	L/G	As (21)	1008 (Ice Only) (1)	S3	S: 4/3/2003	8:45	C01C4	--
MC01C5	Soil (>12")/ Scott Morgan	L/G	As (21)	1010 (Ice Only) (1)	S4	S: 4/3/2003	11:00	C01C5	--
MC01C6	Soil (>12")/ Scott Morgan	L/G	As (21)	1012 (Ice Only) (1)	S7	S: 4/3/2003	11:55	C01C6	--
MC01C7	Sediment/ Brian Dietz	L/G	As (21)	1014 (Ice Only) (1)	SED1	S: 4/3/2003	11:40	C01C7	--
MC01D0	Sediment/ Brian Dietz	L/G	As (21)	1020 (Ice Only) (1)	SED4	S: 4/3/2003	12:55	C01D0	--
MC01D1	Sediment/ Brian Dietz	L/G	As (21)	1022 (Ice Only) (1)	SED5	S: 4/3/2003	9:25	C01D1	--
MC01D2	Sediment/ Brian Dietz	L/G	As (21)	1024 (Ice Only) (1)	SEDWP1	S: 4/3/2003	10:40	C01D2	--
MC01D4	Sediment/ Richelle Hanson	L/G	As (21)	1028 (Ice Only) (1)	SEDWP3	S: 4/3/2003	9:55	C01D4	--

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	MC01C1, MC01F2		
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

AS (AQ) = Arsenic (AQ), AS = Arsenic

TR Number: 3-592370820-040303-0002

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 31571
DAS No:
R

Region:	3
Project Code:	MD-123
Account Code:	03TO3W50102DA3DA3D8LA00
CERCLIS ID:	MDD053948188
Spill ID:	A3D8
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M
Project Leader:	Richelle Hanson
Action:	Expanded Site Investigation/RI
Sampling Co:	MDE

Date Shipped:	4/3/2003
Carrier Name:	FedEx
Airbill:	819742448310
Shipped to:	Chemtech Consulting Group (CHEM) 284 Sheffield Street Mountainside NJ 07092 (908) 789-8900

Chain of Custody Record

Relinquished By	(Date / Time)	Received By	(Date / Time)
1			
2			
3			
4			

Sampler Signature:

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MC01D6	Subsurface Soil (>12")/ Scott Morgan	L/G	As (21)	1032 (Ice Only) (1)	SS10	S: 4/3/2003	11:35	C01D6	--
MC01D7	Subsurface Soil (>12")/ Scott Morgan	L/G	As (21)	1034 (Ice Only) (1)	SS11	S: 4/3/2003	12:35	C01D7	Field Duplicate
MC01D8	Subsurface Soil (>12")/ Scott Morgan	L/G	As (21)	1036 (Ice Only) (1)	SS2	S: 4/3/2003	12:35	C01D8	--
MC01D9	Subsurface Soil (>12")/ Brian Dietz	L/G	As (21)	1038 (Ice Only) (1)	SS3	S: 4/3/2003	8:50	C01D9	--
MC01E0	Subsurface Soil (>12")/ Scott Morgan	L/G	As (21)	1040 (Ice Only) (1)	SS4	S: 4/3/2003	11:05	C01E0	--
MC01E1	Subsurface Soil (>12")/ Scott Morgan	L/G	As (21)	1042 (Ice Only) (1)	SS7	S: 4/3/2003	12:05	C01E1	--
MC01E4	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1050 (HNO3) (1)	SW/WP3	S: 4/3/2003	9:55	C01E4	--
MC01E5	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1052 (HNO3) (1)	SW1	S: 4/3/2003	11:30	C01E5	--
MC01E8	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1058 (HNO3) (1)	SW4	S: 4/3/2003	12:55	C01E8	--
MC01E9	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1060 (HNO3) (1)	SW5	S: 4/3/2003	9:20	C01E9	--

Shipment for Case Complete? Y	**Sample(s) to be used for laboratory QC:** MC01C1, MC01F2	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____

AS (AQ) = Arsenic (AQ), AS = Arsenic

TR Number: 3-592370820-040303-0002

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: 31571
DAS No:
R

Region:	3	**Date Shipped:**	4/3/2003	**Chain of Custody Record**	**Sampler Signature:**
Project Code:	MD-123	**Carrier Name:**	FedEx	**Relinquished By (Date / Time)**	**Received By (Date / Time)**
Account Code:	03TO3W50102DA3DA3D8LA00	**Airbill:**	819742448310	1	
CERCLIS ID:	MDD053948188	**Shipped to:**	Chemtech Consulting Group (CHEM) 284 Sheffield Street Mountainside NJ 07092 (908) 789-8900	2	
Spill ID:	A3D8			3	
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M			4	
Project Leader:	Richelle Hanson				
Action:	Expanded Site Investigation/RI				
Sampling Co:	MDE				

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MC01F0	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1062 (HNO3) (1)	SW6	S: 4/3/2003	11:30	C01F0	Field Duplicate
MC01F1	Surface Water/ Chris Hartman	L/G	AS (AQ) (21)	1064 (HNO3) (1)	SW7	S: 4/3/2003	12:00	C01F1	Field Blank
MC01F2	Surface Water/ Brian Dietz	L/G	AS (AQ) (21)	1066 (HNO3), 1067 (HNO3), 1068 (HNO3) (3)	SW/WP1	S: 4/3/2003	10:40	C01F2	MS/MSD

Shipment for Case Complete? Y	**Sample(s) to be used for laboratory QC:** MC01C1, MC01F2	**Additional Sampler Signature(s):**	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G	**Shipment Iced?** _____
AS (AQ) = Arsenic (AQ), As = Arsenic			

TR Number: 3-592370820-040303-0002

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

U.S. EPA Region III Sample Scheduling Request Form

RAS CASE No: CT1749 / 31571	DAS No:		NSF No:
Date: 3/24/03	Data Validation Level: M3, IM2		EPA Lab Reply:
Site Name: Miller Chemical			Cost:
Address: 2425 Whiteford Road	City: Whiteford		State:MD
Latitude:	Longitude:		Anal +Val Data TAT:42 Days
Program: Superfund	CERCLIS No: MDD053948188		Activity: ESI
Account No: 03T03N50102DA3D8LA00	Operable Unit:		Spill ID:
Preparer: Chris Hartman	RPM/PO:Lorie Baker/Drew Lausch		Site Leader: Richelle Hanson
Phone: 410-537-3453	Phone: 215-814-3355		Phone: 410-537-3493
FAX: 410-537-3472	FAX:		FAX: 410-537-3472
E-mail: chartman@mde.state.md.us	E-mail: lausch.robert@epa.gov		E-mail: rhanson@mde.state.md.us
EPA CO:	Contract Type:	Prime: MDE	Sub:
Lab Assignment Date:	Analytical TAT: 21 Days		Ship Date From: 3/31/03
Organic Lab:			Ship Date To: 4/4/03
Inorganic Lab:			Carrier:

SAMPLES	METHOD	PARAMETER	MATRIX
24	ILM05.2	ICP-AES Arsenic Only	SOIL/SED
12	ILM05.2	ICP-AES Arsenic Only	AQ
24	OLM04.3	PEST /PCBs	Soil/SED
12	OLM04.3	Pest /PCBs	AQ

NOTE: Data validation levels M3 & IM2 require justification. QC field samples must be included as part of total number of samples.

1. Special Instructions: Please send the EDD validated data to Richelle Hanson.
2. Objectives / Project Plan ID / Permit ID:
3. Program / Project / Permit Reporting Limits
4. DQO (QC Requirements)

Appendix D

Laboratory Case Narratives

USEPA - CLP

COVER PAGE

Lab Name: CHEMTECH CONSULTING GROUP Contract: 68-W0-2068

Lab Code: CHEM Case No.: 31571 NRAS No.: SDG No.: MC01C1

SOW No.: ILM05.2

EPA SAMPLE NO.	Lab Sample ID.
MC01C1	R2054-01
MC01C1D	R2054-02
MC01C1S	R2054-03
MC01C2	R2054-04
MC01C3	R2054-05
MC01C4	R2054-06
MC01C5	R2054-07
MC01C6	R2054-08
MC01C7	R2054-09
MC01D0	R2054-10
MC01D1	R2054-11
MC01D2	R2054-12
MC01D4	R2054-13
MC01D6	R2054-14
MC01D7	R2054-15
MC01D8	R2054-16
MC01D9	R2054-17
MC01E0	R2054-18
MC01E1	R2054-19
_____	_____
_____	_____
_____	_____

		ICP-AES	ICP-MS
Were ICP-AES and ICP-MS interelement corrections applied?	(Yes/No)	YES	_____
Were ICP-AES and ICP-MS background corrections applied?	(Yes/No)	YES	_____
If yes-were raw data generated before application of background corrections?	(Yes/No)	NO	_____

Comments:

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (or via an alternate means of electronic transmission, if approved in advance by USEPA) has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Mildred V. Reyes Name: MILDRED V. REYES
Date: 4/23/03 Title: QA/QC DIRECTOR

CHEMTECH

SDG NARRATIVE

USEPA
SDG #MC01C1
CASE # 31571
CONTRACT # 68-W0-2068
LAB NAME: CHEMTECH CONSULTING GROUP
LAB CODE: CHEM
CHEMTECH PROJECT #R2054

A. Number of Samples and Date of Receipt

17 Soil samples were delivered to the laboratory intact on 04/04/03.

B. Parameters
Test requested for Arsenic only.

C. Cooler Temp

Indicator Bottle: **Presence**/Absence
Cooler Temp: 4°C

D. Detail Documentation (related to Sample Handling Shipping, Analytical Problem, Temp of Cooler etc):

E. Corrective Action taken for above:

F. Analytical Techniques:

All analyses were based on CLP Methodology by method ILM05.2

G. Calculation:

Conversion of results from mg/L to mg/kg (Dry Weight Basis):

Mg/Kg = (Result in mg/L) X 1000 X 100/ % Solid X Fraction of Sample Amount Taken in Prep.

Factor of Sample Amount Taken in Prep:

For ICP = 5 (Where Initial Sample Wt. Taken is 1.00 g and Final Volume is 200 ml.)
If the Initial Sample Wt. Is 1.01 g, then the Factor would be 5 X 1.01 = 5.05

For Mercury = 2 (Where Initial Sample Wt. Taken is 0.20 g and Final Volume is 100 ml.)
If the Initial Sample Wt. Is 0.21 g, then the Factor would be 10 X 0.21 = 2.1

For Cyanide = 20(Where Initial Sample Wt. Taken is 1.00 g and Final Volume is 50 ml.)
If the Initial Sample Wt. Is 1.01 g, then the Factor would be 20 X 1.01 = 20.2

CHEMTECH

G. QA/ QC

Calibrations met requirements. Interference check met requirements. Blank analyses did not indicate the presence of contamination. Laboratory Control sample was within control limits. Spike sample did met requirements. Duplicate sample did met requirements. Serial Dilution did met requirements.

I certify that the data package is in compliance with the terms and conditions of the contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Signature _____ Name: Parveen Hasan

Date 04/22/03 Title: QA/QC

COVER PAGE

Lab Name: CHEMTECH CONSULTING GROUP Contract: 68-W0-2068

Lab Code: CHEM Case No.: 31571 NRAS No.: SDG No.: MC01E4

SOW No.: ILM05.2

EPA SAMPLE NO.	Lab Sample ID.
MC01E4	R2055-01
MC01E5	R2055-02
MC01E8	R2055-03
MC01E9	R2055-04
MC01F0	R2055-05
MC01F1	R2055-06
MC01F2	R2055-07
MC01F2D	R2055-08
MC01F2S	R2055-09

		ICP-AES	ICP-MS
Were ICP-AES and ICP-MS interelement corrections applied?	(Yes/No)	YES	
Were ICP-AES and ICP-MS background corrections applied?	(Yes/No)	YES	
If yes-were raw data generated before application of background corrections?	(Yes/No)	NO	

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (or via an alternate means of electronic transmission, if approved in advance by USEPA) has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Mildred V Reyes Name: MILDRED V. REYES
Date: 4/22/03 Title: QA/QC DIRECTOR

000004
SD
4-22-03

CHEMTECH

SDG NARRATIVE

USEPA
SDG #MC01E4
CASE # 31571
CONTRACT # 68-W0-2068
LAB NAME: CHEMTECH CONSULTING GROUP
LAB CODE: CHEM
CHEMTECH PROJECT #R2055

A. Number of Samples and Date of Receipt

07 Water samples were delivered to the laboratory intact on 04/04/03.

B. Parameters
Test requested for Arsenic only.

C. Cooler Temp

Indicator Bottle: **Presence**/Absence
Cooler Temp: 4°C

D. Detail Documentation (related to Sample Handling Shipping, Analytical Problem, Temp of Cooler etc):

E. Corrective Action taken for above:

F. Analytical Techniques:

All analyses were based on CLP Methodology by method ILM05.2

G. Calculation:

Conversion of results from mg/L to mg/kg (Dry Weight Basis):

Mg/Kg = (Result in mg/L) X 1000 X 100/ % Solid X Fraction of Sample Amount Taken in Prep.

Factor of Sample Amount Taken in Prep:

For ICP = 5 (Where Initial Sample Wt. Taken is 1.00 g and Final Volume is 200 ml.)
If the Initial Sample Wt. Is 1.01 g, then the Factor would be 5 X 1.01 = 5.05

For Mercury = 2 (Where Initial Sample Wt. Taken is 0.20 g and Final Volume is 100 ml.)
If the Initial Sample Wt. Is 0.21 g, then the Factor would be 10 X 0.21 = 2.1

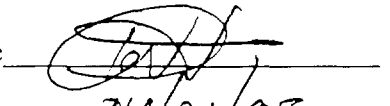
For Cyanide = 20(Where Initial Sample Wt. Taken is 1.00 g and Final Volume is 50 ml.)
If the Initial Sample Wt. Is 1.01 g, then the Factor would be 20 X 1.01 = 20.2

CHEMTECH

G. QA/ QC

Calibrations met requirements. Interference check met requirements. Blank analyses did not indicate the presence of contamination. Laboratory Control sample was within control limits. Spike sample did met requirements. Duplicate sample did met requirements. Serial Dilution did met requirements.

I certify that the data package is in compliance with the terms and conditions of the contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Signature 

Name: Parveen Hasan

Date 04/21/03

Title: QA/QC

Appendix B Organic Data Package and QA/QC Review.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
701 MAPES ROAD
FORT MEADE, MD 20755-5350

DATE : May 28, 2003

SUBJECT: Region III Data QA Review

FROM : Fredrick Foreman
Region III ESAT RPO (3ES20)

TO : Lorie Baker/Drew Lausch
Regional Project Manager (3HS34)

Attached is the organic data validation report for the Miller Chemical/Fertilizer Corp. site (Case #: 31571, SDG#: C01C1, C01E4) completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III ESD.

If you have any questions regarding this review, please call me at (410) 305-2629.

Attachments

cc: Chris Hartman (MDE)

TO File #: 0011 TDF#: 0517

ANALYTICAL SERVICES AND QUALITY ASSURANCE BRANCH

Lockheed Martin Environmental Services
US EPA Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Telephone 410-305-3037 Facsimile 410-305-3597

LOCKHEED MARTIN

DATE: May 28, 2003

SUBJECT: Level M3 Organic Data Validation for RAS Case 31571
SDGs: C01C1, C01E4
Site: Miller Chemical & Fertilizer Corp.

FROM: Hoang Nguyen HJ
Organic Data Reviewer

Mahboobeh Mecanic MM
Senior Organic Data Reviewer

TO: Fredrick Foreman
ESAT Regional Project Officer

OVERVIEW

Case 31571, Sample Delivery Groups (SDGs) C01C1 and C01E4, from the Miller Chemical & Fertilizer Corp. site submitted to Ceimic Corp. (CEIMIC) consisted of seven (7) aqueous and seventeen (17) soil samples for pesticide/PCB analyses. The sample set included one (1) field blank and three (3) field duplicate pairs. All samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) OLM04.2 through Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to Region III Modifications to the National Functional Guidelines for Organic Data Review, Level M3. All samples except C01D2 were successfully analyzed for all target compounds.

MINOR PROBLEM

- Positive results for pesticide/PCB compounds with percent differences (%D) greater than twenty-five percent (>25%) between the two analytical columns were qualified "J" on DSFs.

NOTES

- Soil sample C01D2 (SDG C01C1) was received broken and contaminated with packing material by the laboratory. As a result, the sample was not analyzed and was not reported in this Case.
- No target compounds were detected in any field or method blanks associated with this Case.
- Sample C01C1 was initially analyzed at five-fold (5X) dilution in order to quantitate compounds within calibration range. As a result, quantitation limits for this sample are elevated.
- Several samples were re-analyzed diluted as listed below in order to quantitate one or more compounds which had exceeded the calibration curve in the original analysis. The results for these compounds were reported from the diluted analyses and annotated with a symbol "+" on DSFs.

Sample	Dilution	Compounds
C01C1	50X	heptachlor, heptachlor epoxide, gamma-chlordane
C01C2	10X	heptachlor, dieldrin, 4,4'-DDT, gamma-chlordane
C01C3	10X	heptachlor, dieldrin, 4,4'-DDT, gamma-chlordane
C01C5	10X	4,4'-DDT

- Soil Sample C01D8 (SDG C01C1) reported recovery of surrogate tetrachloro-m-xylene (TCX) outside the lower quality control (QC) limit on one analytical column. No data were qualified in this sample based on the single surrogate recovery outlier.

- The MS/MSD analyses of soil sample C01C1 (SDG C01C1) both reported zero recovery of spike compound aldrin due to dilution. In addition, both reported the recovery of spike compound heptachlor outside the upper QC limit due to the presence of this compound at high concentration in the native sample. Furthermore, recoveries for spike compounds dieldrin and 4,4'-DDT were outside the upper QC limits in the MSD analysis of this sample. The relative percent differences (RPDs) for heptachlor, dieldrin and 4,4'-DDT were also outside QC limits. No data were qualified based on these QC outliers.

- Non-spiked compounds were detected in the analysis of soil sample and their MS/MSD analyses as listed below. Units are in ug/Kg. For consistency purpose, results were reported from the initial analyses at five-fold (5X) dilution.

Compound	C01C1	C01C1MS	C01C1MSD	%RSD
heptachlor epoxide	200 J	270 J	540 J	53
4,4'-DDE	33 J	28 J	39	16
4,4'-DDD	330	260	350	15
alpha-chlordane	54	83	390 J	106
gamma-chlordane	370 J	510 J	2200 J	99

%RSD = Percent Relative Standard Deviation

- Sample weights other than 30 grams for pesticide/PCB extraction were accounted for in dilution factor listed on DSFs.

All data for Case 31571, SDGs C01C1 and C01E4 were reviewed in accordance with Region III Modifications to the National Functional Guidelines for Organic Data Review, September 1994.

ATTACHMENTS

1) Appendix A Glossary of Data Qualifier Codes
2) Appendix B Data Summary Forms
3) Appendix C Chain-of-Custody Records
4) Appendix D Laboratory Case Narrative

DCN: 31571.wpd

Appendix A

Glossary of Data Qualifiers

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

CODES RELATED TO IDENTIFICATION
(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

NO CODE = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unusable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

CODES RELATED TO QUANTITATION
(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

Q = No analytical result.

Appendix B

Data Summary Forms

DATA SUMMARY FORM: PESTICIDES AND PCBS

Case #: 31571 SDG : C01C1 Number of Soil Samples : 16
Site : MILLER CHEMICAL/FERTILIZER CORP. Number of Water Samples : 0
Lab. : CEIMIC

Sample Number :		C01C1		C01C2		C01C3		C01C4		C01C5	
Sampling Location :		S10		S11		S2		S3		S4	
Field QC:				Dup. (C01C3)		Dup. (C01C2)					
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		11:30		12:20		12:20		08:45		11:00	
%Moisture :		24		8		8		14		8	
Dilution Factor :		4.98/49.8		0.99/9.93		0.99/9.87		1.0		1.0/10.0	
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7										
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7	530 +		49 +		45 +				2.0	
Aldrin	1.7										
Heptachlor epoxide	1.7	240 +		8.1		7.5		7.7			
Endosulfan I	1.7										
Dieldrin	3.3	31	J	160 +		140 +		37		56	
4,4'-DDE	3.3	33	J	21		23		11		23	
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3	330						4.0		7.6	J
Endosulfan sulfate	3.3										
4,4'-DDT	3.3	47	J	110 +		100 +		52		130 +	
Methoxychlor	17										
Endrin ketone	3.3										
Endrin aldehyde	3.3										
alpha-Chlordane	1.7	54		7.2		7.9		2.8		3.5	
gamma-Chlordane	1.7	490 +		75 +		73 +		17		17	
Toxaphene	170										
Aroclor-1016	33										
Aroclor-1221	67										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										

CRQL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL * Dilution Factor) / (100 - %Moisture) / 100 Revised 09/99

+ = Reported from diluted analysis

Case #: 31571 SDG : C01C1
Site : MILLER CHEMICAL/FERTILIZER CORP.
Lab. : CEIMIC

Sample Number :		C01C6		C01C7		C01D0		C01D1		C01D4	
Sampling Location :		S7		SED1		SED4		SED5		SEDWP3	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		11:55		11:40		12:55		09:25		09:55	
%Moisture :		8		18		26		43		24	
Dilution Factor :		1.0		0.98		0.99		0.98		1.0	
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7										
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7										
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3							7.6	J		
4,4'-DDE	3.3										
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3							9.1			
Methoxychlor	17										
Endrin ketone	3.3										
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7							3.4	J		
Toxaphene	170										
Aroclor-1016	33										
Aroclor-1221	67										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										

CRQL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRQL * Dilution Factor) / (100 - %Moisture) / 100 Revised 09/99

Case #: 31571 SDG : C01C1
Site : MILLER CHEMICAL/FERTILIZER CORP.
Lab. : CEIMIC

Sample Number :		C01D6		C01D7		C01D8		C01D9		C01E0	
Sampling Location :		SS10		SS11		SS2		SS3		SS4	
Field QC:				Dup. (C01D8)		Dup (C01D7)					
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		11:35		12:35		12:35		08:50		11:05	
%Moisture :		21		25		22		21		21	
Dilution Factor :		1.0		0.98		0.99		0.99		0.99	
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7										
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7										
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3							12			
4,4'-DDE	3.3										
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3										
Methoxychlor	17										
Endrin ketone	3.3										
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										
Aroclor-1016	33										
Aroclor-1221	67										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										

CRQL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRQL * Dilution Factor) / (100 - %Moisture) / 100 Revised 09/99

DATA SUMMARY FORM: PESTICIDES AND PCBS

Case #: 31571 SDG : C01C1
Site : MILLER CHEMICAL/FERTILIZER CORP.
Lab. : CEIMIC

Sample Number :		C01E1									
Sampling Location :		SS7									
Field QC:											
Matrix :		Soil									
Units :		ug/Kg									
Date Sampled :		04/03/2003									
Time Sampled :		12:05									
%Moisture :		22									
Dilution Factor :		0.99									
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7										
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7										
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3										
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3										
Methoxychlor	17										
Endrin ketone	3.3										
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										
Aroclor-1016	33										
Aroclor-1221	67										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										

CRQL = Contract Required Quantitation Limit SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL * Dilution Factor) / (100 - %Moisture) / 100 Revised 09/99

Case #: 31571 SDG : C01E4 Number of Soil Samples : 0
Site : MILLER CHEMICAL/FERTILIZER CORP. Number of Water Samples : 7
Lab. : CEIMIC

Sample Number :		C01E4		C01E5		C01E8		C01E9		C01F0	
Sampling Location :		SW/WP3		SW1		SW4		SW5		SW6	
Field QC:				Dup. (C01F0)						Dup. (C01E5)	
Matrix :		Water		Water		Water		Water		Water	
Units :		ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :		04/03/2003		04/03/2003		04/03/2003		04/03/2003		04/03/2003	
Time Sampled :		09:55		11:30		12:55		09:20		11:30	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.050										
beta-BHC	0.050										
delta-BHC	0.050										
*gamma-BHC (Lindane)	0.050										
*Heptachlor	0.050										
Aldrin	0.050										
Heptachlor epoxide	0.050										
Endosulfan I	0.050										
Dieldrin	0.10										
4,4'-DDE	0.10										
*Endrin	0.10										
Endosulfan II	0.10										
4,4'-DDD	0.10										
Endosulfan sulfate	0.10										
4,4'-DDT	0.10										
*Methoxychlor	0.50										
Endrin ketone	0.10										
Endrin aldehyde	0.10										
alpha-Chlordane	0.050										
gamma-Chlordane	0.050										
*Toxaphene	5.0										
*Aroclor-1016	1.0										
*Aroclor-1221	2.0										
*Aroclor-1232	1.0										
*Aroclor-1242	1.0										
*Aroclor-1248	1.0										
*Aroclor-1254	1.0										
*Aroclor-1260	1.0										

CRQL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS
To calculate sample quantitation limits: (CRQL * Dilution Factor) Revised 09/99

Case #: 31571 SDG : C01E4
Site : MILLER CHEMICAL/FERTILIZER CORP.
Lab. : CEIMIC

Sample Number :		C01F1		C01F2							
Sampling Location :		SW7		SW/WP1							
Field QC:		Field Blank									
Matrix :		Water		Water							
Units :		ug/L		ug/L							
Date Sampled :		04/03/2003		04/03/2003							
Time Sampled :		12:00		10:40							
Dilution Factor :		1.0		1.0							
Pesticide/PCB Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.050										
beta-BHC	0.050										
delta-BHC	0.050										
*gamma-BHC (Lindane)	0.050										
*Heptachlor	0.050										
Aldrin	0.050										
Heptachlor epoxide	0.050										
Endosulfan I	0.050										
Dieldrin	0.10										
4,4'-DDE	0.10										
*Endrin	0.10										
Endosulfan II	0.10										
4,4'-DDD	0.10										
Endosulfan sulfate	0.10										
4,4'-DDT	0.10										
*Methoxychlor	0.50										
Endrin ketone	0.10										
Endrin aldehyde	0.10										
alpha-Chlordane	0.050										
gamma-Chlordane	0.050										
*Toxaphene	5.0										
*Aroclor-1016	1.0										
*Aroclor-1221	2.0										
*Aroclor-1232	1.0										
*Aroclor-1242	1.0										
*Aroclor-1248	1.0										
*Aroclor-1254	1.0										
*Aroclor-1260	1.0										

CRQL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL * Dilution Factor) Revised 09/99

Appendix C

Chain of Custody Records

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

Case No: 31571 **R**
DAS No:

Region:	3	Date Shipped:	4/3/2003	Chain of Custody Record	Sampler Signature:
Project Code:		Carrier Name:	FedEx	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:	03TO3W50102DA3DA3D8LA00	Airbill:	819742448940	1	
CERCLIS ID:	MDD053948188	Shipped to:	Ceimic Corporation 10 Dean Knauss Drive Narragansett RI 02882 (401) 782-8900	2	
Spill ID:	A3D8			3	
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M			4	
Project Leader:	Richelle Hanson				
Action:	Expanded Site Investigation/RI				
Sampling Co:	MDE				

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	QC Type
C01C1	Soil (>12")/ Scott Morgan	L/G	PEST (21)	1044 (Ice Only), 1045 (Ice Only) (2)	S10	S: 4/3/2003	11:30	MC01C1	MS/MSD
C01C2	Soil (>12")/ Scott Morgan	L/G	PEST (21)	1005 (Ice Only) (1)	S11	S: 4/3/2003	12:20	MC01C2	Field Duplicate of C01C3 JSnyder 5-28-03
C01C3	Soil (>12")/ Scott Morgan	L/G	PEST (21)	1007 (Ice Only) (1)	S2	S: 4/3/2003	12:20	MC01C3	–
C01C4	Soil (>12")/ Brian Dietz	L/G	PEST (21)	1009 (Ice Only) (1)	S3	S: 4/3/2003	8:45	MC01C4	–
C01C5	Soil (>12")/ Scott Morgan	L/G	PEST (21)	1011 (Ice Only) (1)	S4	S: 4/3/2003	11:00	MC01C5	–
C01C6	Soil (>12")/ Scott Morgan	L/G	PEST (21)	1013 (Ice Only) (1)	S7	S: 4/3/2003	11:55	MC01C6	–
C01C7	Sediment/ Brian Dietz	L/G	PEST (21)	1015 (Ice Only) (1)	SED1	S: 4/3/2003	11:40	MC01C7	–
C01D0	Sediment/ Brian Dietz	L/G	PEST (21)	1021 (Ice Only) (1)	SED4	S: 4/3/2003	12:55	MC01D0	–
C01D1	Sediment/ Brian Dietz	L/G	PEST (21)	1023 (Ice Only) (1)	SED5	S: 4/3/2003	9:25	MC01D1	–
C01D2	Sediment/ Brian Dietz	L/G	PEST (21)	1025 (Ice Only) (1)	SEDWP1	S: 4/3/2003	10:40	MC01D2	–
C01D4	Sediment/ Richelle Hanson	L/G	PEST (21)	1029 (Ice Only) (1)	SEDWP3	S: 4/3/2003	9:55	MC01D4	–

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	C01C1, C01F2		
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

PEST = CLP TCL Pesticide/PCBs

TR Number: 3-592370820-040303-0001

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

Case No: 311
DAS No:

Region:	3	Date Shipped:	4/3/2003	Chain of Custody Record	Sampler Signature:
Project Code:		Carrier Name:	FedEx	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:	03TO3W50102DA3DA3D8LA00	Airbill:	819742448940	1	
CERCLIS ID:	MDD053948188	Shipped to:	Ceimic Corporation 10 Dean Knauss Drive Narragansett RI 02882 (401) 782-8900	2	
Spill ID:	A3D8			3	
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M			4	
Project Leader:	Richelle Hanson				
Action:	Expanded Site Investigation/RI				
Sampling Co:	MDE				

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	QC Type
C01D6	Subsurface Soil (>12")/ Scott Morgan	L/G	PEST (21)	1033 (Ice Only) (1)	SS10	S: 4/3/2003	11:35	MC01D6	--
C01D7	Subsurface Soil (>12")/ Scott Morgan	L/G	PEST (21)	1035 (Ice Only) (1)	SS11	S: 4/3/2003	12:35	MC01D7	Field Duplicate of C01D8 J Snyder 5.28.03
C01D8	Subsurface Soil (>12")/ Scott Morgan	L/G	PEST (21)	1037 (Ice Only) (1)	SS2	S: 4/3/2003	12:35	MC01D8	--
C01D9	Subsurface Soil (>12")/ Brian Dietz	L/G	PEST (21)	1039 (Ice Only) (1)	SS3	S: 4/3/2003	8:50	MC01D9	--
C01E0	Subsurface Soil (>12")/ Scott Morgan	L/G	PEST (21)	1041 (Ice Only) (1)	SS4	S: 4/3/2003	11:05	MC01E0	--
C01E1	Subsurface Soil (>12")/ Scott Morgan	L/G	PEST (21)	1043 (Ice Only) (1)	SS7	S: 4/3/2003	12:05	MC01E1	--
C01E4	Surface Water/ Brian Dietz	L/G	PEST (21)	1051 (Ice Only) (1)	SW/WP3	S: 4/3/2003	9:55	MC01E4	--
C01E5	Surface Water/ Brian Dietz	L/G	PEST (21)	1053 (Ice Only) (1)	SW1	S: 4/3/2003	11:30	MC01E5	--
C01E8	Surface Water/ Brian Dietz	L/G	PEST (21)	1059 (Ice Only) (1)	SW4	S: 4/3/2003	12:55	MC01E8	--
C01E9	Surface Water/ Brian Dietz	L/G	PEST (21)	1061 (Ice Only) (1)	SW5	S: 4/3/2003	9:20	MC01E9	--

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	C01C1, C01F2		
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____
PEST = CLP TCL Pesticide/PCBs			

TR Number: 3-592370820-040303-0001

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PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

Case No:	31571
DAS No:	

R

				Chain of Custody Record		Sampler Signature:	
Region:	3	Date Shipped:	4/3/2003	Relinquished By	(Date / Time)	Received By	(Date / Time)
Project Code:		Carrier Name:	FedEx	1			
Account Code:	03TO3W50102DA3DA3D8LA00	Airbill:	819742448940	2			
CERCLIS ID:	MDD053948188	Shipped to:	Ceimic Corporation 10 Dean Knauss Drive Narragansett RI 02882 (401) 782-8900	3			
Spill ID:	A3D8			4			
Site Name/State:	MILLER CHEMICAL/FERTILIZER CORP./M						
Project Leader:	Richelle Hanson						
Action:	Expanded Site Investigation/RI						
Sampling Co:	MDE						

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	QC Type
C01F0	Surface Water/ Brian Dietz	L/G	PEST (21)	1063 (Ice Only) (1)	SW6	S: 4/3/2003	11:30	MC01F0	Field Duplicate of C01E5 J. Snyder 5-28-03
C01F1	Surface Water/ Chris Hartman	L/G	PEST (21)	1065 (Ice Only) (1)	SW7	S: 4/3/2003	12:00	MC01F1	Field Blank
C01F2	Surface Water/ Brian Dietz	L/G	PEST (21)	1069 (Ice Only), 1070 (Ice Only) (2)	SW/WP1	S: 4/3/2003	10:40	MC01F2	MS/MSD

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
	C01C1, C01F2		
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____
PEST = CLP TCL Pesticide/PCBs			

TR Number: 3-592370820-040303-0001

REGION COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

Appendix D

Laboratory Case Narratives

SDG Narrative

The enclosed data package is in response to USEPA, Region III, Case No. 31571, SDG No. C01C1, Contract No. 68-W-03-018. Under this SDG there are 18 Pest/PCB analyses for 17 water samples received at Ceimic Corporation on April 4, 2003.

EPA ID:	CEIMIC ID:	Analysis
C01C1	030337-01	Pest/PCB
C01C1MS	030337-01MS	Pest/PCB
C01C1MSD	030337-01MSD	Pest/PCB
C01C2	030337-02	Pest/PCB
C01C3	030337-03	Pest/PCB
C01C4	030337-04	Pest/PCB
C01C5	030337-05	Pest/PCB
C01C6	030337-06	Pest/PCB
C01C7	030337-07	Pest/PCB
C01D0	030337-08	Pest/PCB
C01D1	030337-09	Pest/PCB
C01D2	030337-10	Pest/PCB
C01D4	030337-11	Pest/PCB
C01D6	030337-12	Pest/PCB
C01D7	030337-13	Pest/PCB
C01D8	030337-14	Pest/PCB
C01D9	030337-15	Pest/PCB
C01E0	030337-16	Pest/PCB
C01E1	030337-17	Pest/PCB

Sample Receipt

Cooler Temperatures upon receipt were 6°C.

(2) Instrumentation and Column Identification

The following instruments were used for the analyses:

GC/MS Analysis

A. Pest/PCB

AD6: HP5890II (GC8) using 30m x 0.53mm ID, DB5 megabore column
AD7: HP5890II (GC8) using 30m x 0.53mm ID, DB35 megabore column

(3) Sample Information

An "x" qualifier is flagged by Target Thru-put software whenever the data is manually edited. The letters "M" for GC/MS and "FF" for GC are used on the raw data of the

quantitation report whenever a manual integration is performed. Manual integrations are performed on GC/MS and GC standards and samples when computer generated integration picks up only a portion of the chromatographic peak, due to software limitations. When manual integrations are required, these integrations are performed using sound defensible professional judgment, in order to report accurate data. Each manual integration is signed and dated, and reviewed by both the lab supervisor and the GC/MS Interpretation Specialist for GC/MS or the Organic Lab Manager for Pest/PCB.

A. Pest/PCB Fraction (Method CLP SOW OLM04.3)

All samples were extracted and analyzed within their respective holding times. The container for sample C01D2 arrived broken, thus the sample was not analyzed.

Tetrachloro-m-xylene recovery is low on the DB35 column (29%) in sample C01D8 [030337-14].

The following samples contain one or more target analytes at concentration(s) exceeding the linear range of the initial calibration; the extracts were diluted and reanalyzed:

Sample	Lab ID	Final Dilution Factor
C01C1	030337-01	50
C01C2	030337-02	10
C01C3	030337-03	10
C01C5	030337-05	10

To fulfill contractual obligation, the MS/MSD extracts of sample C01C1 were diluted by a factor of 5 prior to analysis.

The following matrix spike compound recoveries and relative recovery differences are outside of QC limits in sample C01C1 due to the combined effect of dilution factor and uncertainty associated with high target matrix spike compound concentration in the unspiked sample:

Compound	MS recovery	MSD recovery	Relative difference
Heptachlor	455%	11,773%	185%
Aldrin	Not detected	Not detected	N/A
Dieldrin	79%*	180%	78%
4,4'-DDT	33%*	1,825%	193%

*indicates recovery within QC limits.

No multicomponent analytes are identified in any of the samples.

Deviations from the SOW

None other than specified above.

End of SDG Narrative

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature.

Ines Bauer

Ines Bauer, Laboratory Manager

4/15/03

Date

SDG Narrative

The enclosed data package is in response to USEPA, Region III, Case No. 31571, SDG No. C01E4, Contract No. 68-W-03-018. Under this SDG there are 9 Pest/PCB analyses for 7 water samples received at Ceimic Corporation on April 4, 2003.

EPA ID:	CEIMIC ID:	Analysis
C01E4	030338-01	Pest/PCB
C01E5	030338-02	Pest/PCB
C01E8	030338-03	Pest/PCB
C01E9	030338-04	Pest/PCB
C01F0	030338-05	Pest/PCB
C01F1	030338-06	Pest/PCB
C01F2	030338-07	Pest/PCB
C01F2ms	030338-07ms	Pest/PCB
C01F2msd	030338-07msd	Pest/PCB

Sample Receipt

Cooler Temperatures upon receipt were 6°C.

(2) Instrumentation and Column Identification

The following instruments were used for the analyses:

GC/MS Analysis

A. Pest/PCB

AD17: HP5890II (GC6) using 30m x 0.53mm ID, DB5 megabore column
AD18: HP5890II (GC6) using 30m x 0.53mm ID, DB35 megabore column

(3) Sample Information

An "x" qualifier is flagged by Target Thru-put software whenever the data is manually edited. The letters "M" for GC/MS and "FF" for GC are used on the raw data of the quantitation report whenever a manual integration is performed. Manual integrations are performed on GC/MS and GC standards and samples when computer generated integration picks up only a portion of the chromatographic peak, due to software limitations. When manual integrations are required, these integrations are performed using sound defensible professional judgment, in order to report accurate data. Each manual integration is signed and dated, and reviewed by both the lab supervisor and the GC/MS Interpretation Specialist for GC/MS or the Organic Lab Manager for Pest/PCB.

A. Pest/PCB Fraction (Method CLP SOW OLM04.3)

No non-compliances noted.

Deviations from the SOW

None other than specified above.

End of SDG Narrative

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature.

Ines Bauer

Ines Bauer, Laboratory Manager

4/10/03

Date

Ryan Montalbano

From: Sturdavant, Holly [Holly.Sturdavant@dyncorp.com]
Sent: Tuesday, April 08, 2003 10:10 AM
To: Fred Kwolek (E-mail); Henry Leibovitz (E-mail); Jessica Robinson (E-mail); Ryan Montalbano (E-mail)
Cc: Betty Ann Jeffery (E-mail); Dan Slizys (E-mail); John Kwedar (E-mail); Khin-Cho Thaung (E-mail)
Subject: Region 03 | Case 31571 | Lab CEIMIC | Issue Broken samples | FINAL

Ryan,

Following is the resolution from Region 3 regarding broken sample CEIM3. Per the Region, the sampler will not collect a replacement sample. The lab should cancel the analysis of this sample, document the issue in the Case/SDG narrative, and submit the tag for this sample to the Region with the data package.

Please let me know if you have any other questions or problems.

Thanks,
Holly

Holly Rogers Sturdavant
CSC
CLP Coordinator for Regions 3, 7, & 9
703-264-9526
holly.sturdavant@dyncorp.com or holly.rogers@dyncorp.com

----Original Message-----
From: Slizys.Dan@epamail.epa.gov [mailto:Slizys.Dan@epamail.epa.gov]
Sent: Tuesday, April 08, 2003 8:19 AM
To: Sturdavant, Holly
Cc: Betty Ann Jeffery (E-mail); John Kwedar (E-mail); Khin-Cho Thaung (E-mail)
Subject: Re: NEW ISSUE | Case 31571 | Lab CEIMIC | Issue Broken samples

Holly,

They will not collect a new sample. The lab must document that the sample was broken and contaminated in the case narrative. They should send the tag to the region with the data package.

From: "Sturdavant, Holly"<Holly.Sturdavant@dyncorp.com>

To: Betty Jeffery/ESC/R3/USEPA/US@EPA, Dan Slizys/ESC/R3/USEPA/US@EPA, John Kwedar/ESC/R3/USEPA/US@EPA, Khin-Cho Thaung/ESC/R3/USEPA/US@EPA
cc:
Subject: NEW ISSUE | Case 31571 | Lab CEIMIC | Issue Broken samples

04/07/2003 09:19 AM

Dan,

Please let me know if the sampler plans to re-collect the sample. Also, the lab would like to know if they should include the sample tag for this broken sample in the CSF upon completion of the analysis of the other samples in this Case.

Please advise.

Thanks,
Holly

Holly Rogers Sturdavant
CSC
CLP Coordinator for Regions 3, 7, & 9
703-264-9526
holly.sturdavant@dyncorp.com or holly.rogers@dyncorp.com

-----Original Message-----
From: Slizys.Dan@epamail.epa.gov [mailto:Slizys.Dan@epamail.epa.gov]
Sent: Monday, April 07, 2003 8:26 AM
To: Sturdavant, Holly; Baker.Lorie@epamail.epa.gov; chartman@mde.state.md.us; rhanson@mde.state.md.us
Cc: Betty Ann Jeffery (E-mail); John Kwedar (E-mail); Khin-Cho Thaung (E-mail)
Subject: Re: NEW ISSUE | Case 31571 | Lab CEIMIC | Issue Broken samples

Holly,

The lab must not analyze the sample since it was contaminated by the vermiculite packing material. The field personnel will be notified of the breakage.

Chris and Richelle,

Sample C01D2 was received broken by the lab. The sample was contaminated. Will you collect another sample from this site location? Please provide input as soon as possible.

From: "Sturdavant, Holly"<Holly.Sturdavant@dyncorp.com>
To: Betty Jeffery/ESC/R3/USEPA/US@EPA, Dan Slizys/ESC/R3/USEPA/US@EPA, John Kwedar/ESC/R3/USEPA/US@EPA, Khin-Cho Thaung/ESC/R3/USEPA/US@EPA
cc:
Subject: NEW ISSUE | Case 31571 | Lab CEIMIC | Issue Broken samples
04/04/2003 02:46 PM

Following is an email from CEIMIC regarding samples received for Case 31571. Please see below and advise on how the lab should proceed.

Thanks,
Holly

Holly Rogers Sturdavant
CSC
CLP Coordinator for Regions 3, 7, & 9
703-264-9526
holly.sturdavant@dyncorp.com or holly.rogers@dyncorp.com

-----Original Message-----
From: Ryan Montalbano [mailto:rmontalbano@ceimic.com]
Sent: Friday, April 04, 2003 1:54 PM
To: Sturdavant, Holly
Subject: Case 31571, broken unsalvageable sample

Hi Holly.

The jar for soil sample C01D2 was received broken. All of the soil mixed in with the vermiculite packing material and was unsalvageable. Sample receiving personnel feels that the sample could have been saved and transferred to a clean jar, had the samplers placed the jar in a plastic bag before packing.

Please advise us on how to proceed. Specifically, sample control personnel would like to know if the sample tag should be included in the DIF upon completion of the analysis of other samples in this case.

-Ryan

Ryan C. Montalbano
Gas Chromatography Laboratory Supervisor
Ceimic Corporation
10 Dean Knauss Drive
Narragansett, RI 02882
(401)782-8900
Fax (401)782-8905
rmontalbano@ceimic.com

Appendix C Toxicological Evaluation.

Maryland Department of the Environment
Waste Management Administration
Environmental Restoration and Redevelopment Program

MEMORANDUM

TO: Richelle Hanson, Project Manager
Site Assessment/Brownfields

THROUGH: Patti Davis, Section Head
Site Assessment/Brown

FROM: Mark A. Mank, Toxicologist
Environmental Restoration and Redevelopment Program

SUBJECT: Toxicological Evaluation – Miller Chemical, Whiteford, Harford County, Maryland

DATE: June 24, 2003

The toxicological evaluation for Miller Chemical located in Whiteford, Maryland is attached. The toxicological evaluation assumed the future use of the site to be commercial.

Risk estimates for the incidental ingestion of detected noncarcinogenic surface soil contaminants exceeded MDE and EPA recommended risk levels for the child visitor and construction worker commercial populations. The estimated risks from the incidental ingestion of detected noncarcinogenic surface soil contaminants were within MDE and EPA recommended levels of risk for the youth visitor and adult worker commercial populations. Risk estimates for incidental ingestion of detected carcinogenic surface soil contaminants exceeded MDE recommended risk ranges for the child visitor, youth visitor and adult worker commercial populations. Carcinogenic risk estimates for incidental ingestion of detected surface soil contaminants were within MDE recommended risk ranges for the construction worker commercial population and EPA recommended risk ranges for all commercial populations. The estimated noncarcinogenic risk estimates from incidental ingestion of detected subsurface soil contaminants were below MDE and EPA recommended levels for all commercial populations. Carcinogenic risk estimates from incidental ingestion of detected subsurface soil contaminants exceeded MDE recommended levels for the child visitor commercial population. The estimated carcinogenic risk estimates from incidental ingestion of detected subsurface soil contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA risk ranges for all commercial populations. The estimated carcinogenic risk levels from the inhalation of detected and nondetected volatiles and fugitive dust from surface and subsurface soils were within acceptable levels as recommended by EPA and MDE for all commercial populations. Risk estimates for dermal exposure to detected noncarcinogenic surface and subsurface soil contaminants were within MDE and EPA recommended levels for all commercial populations. Risk estimates for dermal exposure to

detected carcinogenic surface soil contaminants exceeded MDE recommended risk ranges for the child visitor commercial population. Dermal contact risk estimates for exposure to surface soil contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA recommended risk ranges for all commercial populations. Risk estimates for dermal exposure to detected carcinogenic subsurface soil contaminants were within MDE and EPA recommended ranges for all commercial populations.

Risk estimates for the incidental ingestion of detected noncarcinogenic sediment contaminants exceeded MDE and EPA recommended risk levels for the child visitor commercial population. Noncarcinogenic risks from the incidental ingestion of detected sediment contaminants were within MDE and EPA recommended levels of risk for the youth visitor, adult worker and construction worker commercial populations. Risk estimates for incidental ingestion of detected carcinogenic sediment contaminants exceeded MDE recommended risk range for the child visitor, youth visitor and adult worker commercial populations. Carcinogenic risk estimates for incidental ingestion of detected sediment contaminants were within MDE recommended risk ranges for the construction worker commercial population and EPA recommended risk ranges for all commercial populations. The estimated carcinogenic risk levels from the inhalation of detected volatiles and fugitive dust from sediment contaminants were within acceptable levels as recommended by EPA and MDE for all commercial populations. Risk estimates for dermal exposure to detected noncarcinogenic sediment contaminants were within MDE and EPA recommended levels for all commercial populations. Risk estimates for dermal exposure to detected carcinogenic sediment contaminants exceeded MDE recommended risk ranges for the child visitor commercial population. Risk estimates for dermal exposure to detected carcinogenic sediment contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA recommended risk ranges for all commercial populations. One detected contaminant, arsenic, exceeded the respective NOAA ERM value.

Risk estimates for the incidental ingestion of detected carcinogenic and noncarcinogenic surface water contaminants while swimming were within MDE and EPA recommended risk levels for all commercial populations. One detected contaminant, arsenic, exceeded the respective human health AWQC value for fish consumption.

No detected surface or subsurface soil contaminant exceeded a hazard index (HI) of 1 or cancer risk of greater than 1×10^{-5} from the volatilization of detected noncarcinogenic and carcinogenic soil contaminants into indoor air.

One contaminant, arsenic, was detected in surface soil, subsurface soil and sediment at concentrations that exceeded the corresponding MDE non-residential soil cleanup standard. One detected surface water contaminant, arsenic, exceeded their corresponding MDE non-residential tap water cleanup standard.

Please contact me (x3436) if you have any questions.
/MAM
attachment

Miller Chemical
Whiteford, Maryland
Toxicological Evaluation

Summary

This toxicological evaluation examines the human health risks associated with Miller Chemical and Fertilizer Corporation located in Whiteford, Harford County, Maryland. This site was evaluated for child visitor (1-6 years), youth visitor (6-17), adult worker and construction worker populations under a commercial future use scenario. The site was evaluated for risks associated with commercial use populations only. Residential use scenarios are expected to have greater levels of risk and should be evaluated to reflect appropriate land use scenarios. The United States Environmental Protection Agency (EPA) has recommended default exposure parameters that were used to estimate cumulative risk from all chemicals (1, 2, and 3). EPA recognizes as an acceptable Hazard Index (HI) values less than or equal to 1 (noncarcinogenic chemicals) and excess lifetime cancer risk (CR) less than or equal to 10^{-6} to 10^{-4}. The Maryland Department of the Environment (MDE) recognizes as an acceptable HI values less than or equal to 1 and excess lifetime cancer risk less than or equal to 10^{-6} to 10^{-5}. Based on these exposures, estimated risks at the site were compared to MDE and EPA recommended levels, and the following conclusions were reached:

Summary table of Hazard Indices (HI) values and Cancer Risk (CR) values for each commercial population

Noncarcinogenic Endpoints Detected Contaminants Only

Population	Pathway	Hazard Index	Risk Drivers
Child visitor	Ingestion-surface soil	2	Arsenic
Construction worker	Ingestion-surface soil	2	Arsenic
Child visitor	Ingestion-sediment	2	Arsenic

Carcinogenic Endpoints Detected Contaminants Only

Population	Pathway	Cancer Risk	Risk Drivers
Child visitor	Ingestion-surface soil	6.0×10^{-5}	Arsenic
Youth visitor	Ingestion-surface soil	2.2×10^{-5}	Arsenic
Adult worker	Ingestion-surface soil	2.5×10^{-5}	Arsenic
Child visitor	Ingestion-subsurface soil	1.7×10^{-5}	Arsenic
Child visitor	Dermal contact-surface soil	1.2×10^{-5}	Arsenic
Child visitor	Ingestion-sediment	8.1×10^{-5}	Arsenic
Youth visitor	Ingestion-sediment	3.0×10^{-5}	Arsenic
Adult worker	Ingestion-sediment	1.8×10^{-5}	Arsenic
Child visitor	Dermal contact-sediment	1.4×10^{-5}	Arsenic

Site Description

The 26-acre former Miller Chemical and Fertilizer Corporation site is located at 2425 Whiteford Road in Whiteford, Harford County, Maryland. The site is situated immediately to the west of the former Whiteford Packing Company. Historically, railroad tracks ran along the boundary between the two properties. The property is currently owned by the Trenton Bone Company in care of Lebanon-Seaboard. The property has been in use since 1963 as a manufacturer and distributor of pesticides, fertilizers and fungicides. The property is currently used for the mixing of dry chemicals with water to create liquid fertilizer. The southern portion of the property houses the company buildings and parking lot. The central portion of the property is a non-disturbed area formerly used as drainage ponds. The northern portion of the property is a wooded, undeveloped area. Environmental investigations have been performed on the site in the recent past and the current investigation focused on potential arsenic and select pesticide contamination.

1.0 Method

In evaluating risk to human health, maximum concentrations of all chemicals detected in soil and sediment were compared to medium-specific screening levels (EPA Region III Risk Based Concentration values and Maryland Department of the Environment Cleanup Standards). Chemicals that exceeded human health Risk Based Concentration (RBC) values were then evaluated quantitatively. Relevant toxicological data and RBC values from surrogate compounds (structurally similar analogues) were used for some of the chemicals with no corresponding RBC value. Soil samples were collected from locations on the site. Depth to groundwater and site conditions precluded the collection of groundwater samples, however, surface water samples were collected and analyzed.

1.1 Human Health

Maximum concentrations of all chemicals detected in soils (dry weight values) and sediment were compared to the EPA Region III Risk Based Concentrations (RBC) for residential soil (4). Comparison of dry weight analytical values to the RBCs is recognized as a conservative measure but provides consistency in risk assessments across sites (with variable soil moisture content) and sampling time. Prior to comparison with each chemical concentration, noncarcinogenic RBCs were multiplied by 0.1, in order to account for any additive systemic effects. Carcinogenic RBC values were not adjusted and represent a target risk level of 10^{-6}. Carcinogenic and noncarcinogenic risk levels for all contaminants that exceeded their respective RBC screening level were evaluated quantitatively. The quantitative evaluation was based on expected future use and development scenarios and includes populations typically expected to frequent the site based on this proposed future use.

The future land use at the site was assumed to be commercial; therefore, the commercial exposure scenario was used to evaluate risk at the site. The contaminants identified at the site at concentrations that exceeded residential RBCs were further evaluated with regard to risk to relevant populations under the following scenarios (1, 2, 3, and 7):

Commercial Development:

Soil (Surface and Subsurface):

Adult Worker: 70 kg body weight, 3280 cm^2 skin surface area (soil), 0.05 skin adherence factor, 250 days per year exposure for soil ingestion, 50 mg soil ingested per day, 1 m^3/hour inhalation rate, 8 hour exposure time (inhalation soil), 25 year exposure duration, 70 year lifetime.

Construction Worker: 70 kg body weight, 3280 cm^2 skin surface area (soil), 0.05 skin adherence factor, 250 days per year exposure for soil ingestion, 480 mg soil ingested per day, 1.5 m^3/hour inhalation rate, 8 hour exposure time (inhalation soil), 1 year exposure duration, 70 year lifetime.

Youth Intermittent Visitor (6 - 17 years): 40 kg body weight, 4320 cm^2 skin surface area (soil), 0.02 skin adherence factor, 132 days per year exposure for soil ingestion, 100 mg soil ingested per day, 0.56 m^3/hour inhalation rate, 4 hour exposure time (soil inhalation), 12 year exposure duration, 70 year lifetime.

Child Intermittent Visitor (1 - 6 years): 15 kg body weight, 2350 cm^2 skin surface area (soil), 0.06 skin adherence factor, 132 days per year exposure for soil ingestion, 200 mg soil ingested per day, 0.32 m^3/hour inhalation rate, 4 hour exposure time (soil inhalation), 6 year exposure duration, 70 year lifetime.

Sediment:

Adult Worker: 30-year exposure duration, 70 kg body weight, 5700 cm^2 skin surface area, 52 days per year exposure for sediment ingestion, 100 mg sediment ingested per day, 4 hours inhalation, 0.07 mg/cm^2-event soil to skin adherence factor. 0.833 m^3/hour inhalation rate, 70-year lifetime.

Construction Worker: 70 kg body weight, 3280 cm^2 skin surface area, 0.08mg/cm^2-event soil to skin adherence factor, 52 days per year exposure for sediment ingestion, 480 mg sediment ingested per day, 1.5 m^3/hour inhalation rate, 8 hour exposure time (inhalation soil), 1 year exposure duration, 70 year lifetime.

Youth (6 - 17 years) Visitor: 40 kg body weight, 4320 cm^2 skin surface area, 0.07mg/cm^2-event soil to skin adherence factor, 52 days per year sediment ingestion, 100 mg sediment ingested per day, 0.56 m^3/hour inhalation rate, 4 hours inhalation exposure, 12 year exposure duration, 70 year lifetime.

Child (1 - 6 years) Visitor: 15 kg body weight, 2350 cm^2 skin surface area, 0.5mg/cm^2-event soil to skin adherence factor, 52 days per year sediment ingestion, 200 mg sediment ingested per day, 0.32 m^3/hour inhalation rate, 4 hour inhalation exposure, 6 year exposure duration, 70 year lifetime.

Adult Swimmer: 70 kg body weight, 12 events per year, 50 ml water ingested per event, 1 hour exposure time per event, 30 year exposure duration, 70 year lifetime, 18150 cm^2 skin surface area while swimming.

Youth Swimmer (6 - 17 years): 40 kg body weight, 12 events per year, 50 ml water ingested per event, 1 hour exposure time per event, 12 year exposure duration, 70 year lifetime.

Child Swimmer (1 - 6 years): 15 kg body weight, 12 events per year, 50 ml water ingested per event, 1 hour exposure time per event, 6 year exposure duration, 70 year lifetime.

2.0 Human Health Evaluation

Soil samples were analyzed for arsenic and pesticides. Chemicals that were detected on site were compared to medium-specific screening levels (USEPA Region III RBC values). Chemicals that were not detected at the site and exceeded RBC values (at an assumed concentration of one-half the detection level) were carried through the quantitative risk assessment and were included in the summation of noncarcinogenic hazard quotients and carcinogenic cancer risk values for comparative purposes only. Chemicals detected at the site that exceeded human health RBC values were evaluated quantitatively using the maximum detected concentration as the site-wide average concentration in the quantitative risk estimates.

The EPA has issued a directive for lead that recommends a soil screening level of 400 mg/kg for residential scenarios at RCRA facilities and CERCLA sites; the 400-mg/kg soil screening level was used in this evaluation for soil (5).

2.1 Soil

The chemicals detected in soil that exceeded the residential soil RBCs (i.e. failed the initial screening process, see Attachment A) were evaluated quantitatively. Soil exposures were evaluated via the ingestion, inhalation, dermal contact and vapor intrusion of volatiles to indoor air pathways. Reference dose (RfD) and cancer slope factor (CSF) values were obtained from EPA Region III and IRIS (4, 6). Estimates of noncarcinogenic and carcinogenic risks from dermal contact were calculated when sufficient data (permeability constants (8), oral absorption efficiencies and dermal absorption factors (9)) were available.

2.2 Sediment

Sediment samples from the site were analyzed for metals and pesticides. The chemicals detected in sediment that exceeded the NOAA ERM values were evaluated quantitatively. Sediment exposures were evaluated via the ingestion, inhalation, dermal contact and vapor intrusion of volatiles to indoor air pathways.

2.3 Groundwater

Groundwater samples were not collected or analyzed on the site.

2.4 Surface water

Surface water samples from the site were analyzed for metals and pesticides. The chemicals detected in surface water that exceeded the AWQC values were evaluated quantitatively. Surface water exposures were evaluated via ingestion while swimming.

2.5 Vapor Intrusion

All volatile and semivolatile contaminants detected in soil were quantitatively evaluated for vapor intrusion using the Johnson and Ettinger Tier I vapor intrusion model (10).

2.6 MDE Cleanup Standards Screen

All soil samples collected on site were compared to the MDE *State of Maryland Department of the Environment Cleanup Standards for Soil and Groundwater* Interim Final Guidance, August 2001 (11).

3.0 Conclusion

3.1 Soil

Risk estimates for the incidental ingestion of detected noncarcinogenic surface soil contaminants exceeded MDE and EPA recommended risk levels for the child visitor and construction worker commercial populations (Table 1). Arsenic was the noncarcinogenic risk driver for the affected population. The estimated risks from the incidental ingestion of detected noncarcinogenic surface soil contaminants were within MDE and EPA recommended levels of risk for the youth visitor and adult worker commercial populations. Risk estimates for incidental ingestion of detected carcinogenic surface soil contaminants exceeded MDE recommended risk ranges for the child visitor, youth visitor and adult worker commercial populations (Table 2). Arsenic was the carcinogenic risk driver for the affected populations. Carcinogenic risk estimates for incidental ingestion of detected surface soil contaminants were within MDE recommended risk ranges for the construction worker commercial population and EPA recommended risk ranges for all commercial populations. The estimated noncarcinogenic risks from incidental ingestion of detected subsurface soil contaminants were below MDE and EPA recommended thresholds for all commercial populations (Tables 3). Carcinogenic risk estimates from incidental ingestion of detected subsurface soil contaminants exceeded MDE recommended levels for the child visitor commercial population (Table 4). Arsenic was the noncarcinogenic risk driver for the affected population. The carcinogenic risk estimates from incidental ingestion of detected subsurface soil contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA risk range for all commercial populations. The estimated carcinogenic risk levels from the inhalation of detected and nondetected volatiles and fugitive dust from surface and subsurface soils were within acceptable levels as recommended by EPA and MDE (Tables 5 and 6) for all commercial populations. Noncarcinogenic risks from the inhalation of volatiles and fugitive dust were not evaluated on site due to the fact that no noncarcinogenic contaminants exceeded the Region III RBC screening values. Risk estimates for dermal exposure to detected noncarcinogenic surface and subsurface

soil contaminants were within MDE and EPA recommended levels for all commercial populations (Tables 7 and 9). Risk estimates for dermal exposure to detected carcinogenic surface soil contaminants exceeded MDE recommended risk ranges for the child visitor commercial population (Table 8). Arsenic was the carcinogenic dermal contact risk driver. Dermal contact risk estimated for exposure to surface soil contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA recommended risk ranges for all commercial populations. Risk estimates for dermal exposure to detected carcinogenic subsurface soil contaminants were within MDE and EPA recommended ranges for all commercial populations (Table 10).

3.2 Sediment

Risk estimates for the incidental ingestion of detected noncarcinogenic sediment contaminants exceeded MDE and EPA recommended risk levels for the child visitor commercial population (Table 11). Arsenic was the noncarcinogenic risk driver for the affected population. Noncarcinogenic risks from the incidental ingestion of detected sediment contaminants were within MDE and EPA recommended levels of risk for the youth visitor, adult worker and construction worker commercial populations. Risk estimates for incidental ingestion of detected carcinogenic sediment contaminants exceeded MDE recommended risk range for the child visitor, youth visitor and adult worker commercial populations (Table 12). Arsenic was the carcinogenic risk driver for the affected populations. Carcinogenic risk estimates for incidental ingestion of detected sediment contaminants were within MDE recommended risk ranges for the construction worker commercial population and EPA recommended risk ranges for all commercial populations.

The estimated carcinogenic risk levels from the inhalation of detected volatiles and fugitive dust from sediment contaminants were within acceptable levels as recommended by EPA and MDE (Tables 13) for all commercial populations. Risk estimates for dermal exposure to detected noncarcinogenic sediment contaminants were within MDE and EPA recommended levels for all commercial populations (Table 14). Risk estimates for dermal exposure to detected carcinogenic sediment contaminants exceeded MDE recommended risk ranges for the child visitor commercial population (Table 15). Arsenic was the dermal contact risk driver for sediment exposure. Risk estimates for dermal exposure to detected carcinogenic sediment contaminants were within MDE recommended risk ranges for the youth visitor, adult worker and construction worker commercial populations and EPA recommended risk ranges for all commercial populations. Sediment contaminant concentrations were compared to available NOAA ERM values. One detected contaminant, arsenic, exceeded the respective NOAA ERM value (Table 16).

3.3 Groundwater

Risk estimates for commercial groundwater exposure were not evaluated for the site.

3.4 Surface water

Risk estimates for the incidental ingestion of detected carcinogenic and noncarcinogenic surface water contaminants while swimming were within MDE and EPA recommended risk levels for all commercial populations (Table 17 and 18). Surface water contaminant concentrations were compared to available Ambient Water Quality Criteria values. One detected contaminant, arsenic, exceeded the respective human health AWQC value for fish consumption (Table 19).

3.5 Vapor Intrusion

The risk from subsurface vapor intrusion of detected volatile and semivolatile contaminants in surface soil and subsurface soil into buildings was evaluated using the Johnson and Ettinger vapor intrusion model (Attachment B). No detected surface and subsurface soil contaminant exceeded the hazard index (HI) of 1 or cancer risk of greater than 1×10^{-5} for commercial populations.

3.6 MDE Cleanup Standards Screen

Maximum concentrations of all chemicals analyzed in soil and sediment compared to their corresponding MDE non-residential cleanup standard (Attachment A). One contaminant, arsenic, was detected in surface soil, subsurface soil and sediment at a concentration that exceeded the corresponding MDE non-residential soil cleanup standard. Maximum concentrations of all chemicals analyzed in surface water were compared to their corresponding MDE non-residential groundwater cleanup standard (Attachment A). One detected surface water contaminant, arsenic, exceeded their corresponding MDE non-residential tap water cleanup standard.

3.7 Evaluation Assumptions

When determining whether an increased risk to human health exists at this site, it is important to understand that this evaluation was prepared as a first level screening evaluation. Many conservative assumptions are included in this evaluation, which were developed with the understanding that if the estimated risk, using the conservative assumptions, does not exceed EPA's recommended levels, then the risk estimated using more realistic scenarios will not exceed these levels.

Since this evaluation includes many conservative assumptions, a risk that exceeds EPA's recommended level of risk does not necessarily indicate an increased risk to human health. When this situation occurs, it is necessary to consider several points when determining if the risk actually does represent a threat to human health. For example, the quantitative risk estimate in this evaluation assumes people will be exposed to a contaminant at the maximum concentration all throughout the site and for the entire exposure duration. These assumptions do not take into account whether the maximum concentration is anomalous or characteristic of the site, or that biodegradation, dispersion, dilution, or other factors may decrease the contaminant concentration throughout the time of exposure.

This evaluation also assumes that the bioavailability of each contaminant is 100 percent, and that all of the contaminant taken into the body is absorbed across the digestive tract into the body. A chemical is harmful to human health only if it is absorbed into the body. Assuming complete bioavailability does not consider the fact that it is common for a fraction of the chemical taken into the body to be excreted rather than absorbed into the body. The bioavailability of a contaminant is dependent on many factors, such as the state or form of the contaminant and if the actual size of the contaminant particle would permit incidental ingestion. These issues must be considered when evaluating the appropriateness of assuming total bioavailability of a contaminant.

4.0 References

1. EPA. 1989. *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) Interim Final.* Office of Emergency and Remedial Response. EPA/540/1-89/002.

2. EPA. 1991. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance "Standard Default Exposure Factors" Interim Final.* Office of Emergency and Remedial Response. OSWER Directive: 9285.6-03.

3. EPA. 1991. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk/based Preliminary Remediation Goals) Interim.* Office of Emergency and Remedial Response. EPA/540/R-92/003.

4. EPA. Region III. Risk-Based Concentration Table, April 4, 2002.

5. EPA. *Memorandum: Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.* Office of Solid Waste and Emergency Response. OSWER Directive # 9355.4-12.

6. EPA. Integrated Risk Information System. 2000.

7. EPA. 1997. *Exposure Factors Handbook, Volume I, General Factors.* Office of Research and Development. EPA/600/P-95/002Fa.

8. EPA. 1992. *Dermal Exposure Assessment: Principles and Applications.* EPA/600/8-91/011B.

9. EPA. Region III, 1995. *Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure from Soil.* EPA/903-K-95-003.

10. EPA. *User's Guide for the Johnson and Ettinger (1991) Model for subsurface Vapor Intrusion into Buildings.* September 1997.

11. Maryland Department of the Environment. *State of Maryland Department of the Environment Cleanup Standards for Soil and Groundwater.* Interim Final Guidance. August 2001.

Table 1. Quantitative Risk Assessment - Noncarcinogens
Commercial Use - Incidental Ingestion/Surface Soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
ARSENIC	92		3E-04	5E-05	2E-01	4E-04	1E+00	8E-05	3E-01	4E-04	1E+00
DIELDRIN	0.16		5E-05	8E-08	2E-03	8E-07	2E-02	1E-07	3E-03	8E-07	2E-02
HEPTACHLOR	0.53		5E-04	3E-07	5E-04	2E-06	5E-03	5E-07	1E-03	3E-06	5E-03
HEPTACHLOR EPOXIDE	0.24		1E-05	1E-07	9E-03	1E-06	9E-02	2E-07	2E-02	1E-06	9E-02
Hazard Index for Detected Compounds Only:				**Sum =**	**1.6E-01**	**Sum =**	**1.5E+00 ***	**Sum =**	**3.0E-01**	**Sum =**	**1.6E+00 ***
Hazard Index for Detected and Nondetected Compounds:				**Sum =**	**1.6E-01**	**Sum =**	**1.5E+00 ***	**Sum =**	**3.0E-01**	**Sum =**	**1.6E+00 ***

ADD = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.

* Hazard quotient or hazard index exceeds 1.5

Table 2. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Incidental Ingestion/Surface soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	92		2E+00	2E-05	2E-05	6E-06	9E-06	1E-05	2E-05	4E-05	6E-05
DIELDRIN	0.16		2E+01	3E-08	4E-07	1E-08	2E-07	2E-08	4E-07	7E-08	1E-06
HEPTACHLOR	0.53		5E+00	9E-08	4E-07	4E-08	2E-07	8E-08	4E-07	2E-07	1E-06
HEPTACHLOR EPOXIDE	0.24		9E+00	4E-08	4E-07	2E-08	1E-07	4E-08	3E-07	1E-07	9E-07
Cancer Risk for Detected Compounds Only:				**Sum =**	**2.5E-05**	**Sum =**	**9.7E-06**	**Sum =**	**2.2E-05**	**Sum =**	**6.0E-05**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**2.5E-05**	**Sum =**	**9.7E-06**	**Sum =**	**2.2E-05**	**Sum =**	**6.0E-05**

ADD = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
Cancer risk exceeds 10E-4.

Table 3. Quantitative Risk Assessment - Noncarcinogl...
Commercial Use - Incidental Ingestion/Subsurface Soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
SENIC	27.2		3E-04	1E-05	4E-02	1E-04	4E-01	2E-05	8E-02	1E-04	4E-01
Hazard Index for Detected Compounds Only:				Sum =	4.4E-02	Sum =	4.3E-01	Sum =	8.2E-02	Sum =	4.4E-01
Hazard Index for Detected and Nondetected Compounds:				Sum =	4.4E-02	Sum =	4.3E-01	Sum =	8.2E-02	Sum =	4.4E-01

)D = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.
lazard quotient or hazard index exceeds 1.5.

Table 4. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Incidental Ingestion/Subsurface soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	27.2		2E+00	5E-06	7E-06	2E-06	3E-06	4E-06	6E-06	1E-05	2E-05
Cancer Risk for Detected Compounds Only:				**Sum =**	**7.1E-06**	**Sum =**	**2.7E-06**	**Sum =**	**6.3E-06**	**Sum =**	**1.7E-05**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**7.1E-06**	**Sum =**	**2.7E-06**	**Sum =**	**6.3E-06**	**Sum =**	**1.7E-05**

D = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
ncer risk exceeds 10E-4.

Table 5. Qua...ive I Asse[it - (ioge

Commercial Use - Inhalation of Volatiles and Fugitive Dust (Surface Soil).

For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	PEF/VF	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
					LADD	CR	LADD	CR	LADD	CR	LADD	CR
iculate Emission:				**PEF**								
RSENIC	92		2E+01	5.66E+08	5E-09	7E-08	3E-10	4E-09	6E-10	9E-09	4E-10	6E-09
IELDRIN	0.16		2E+01	5.66E+08	8E-12	1E-10	5E-13	8E-12	1E-12	2E-11	7E-13	1E-11
EPTACHLOR	0.53		5E+00	5.66E+08	3E-11	1E-10	2E-12	7E-12	3E-12	1E-11	2E-12	1E-11
EPTACHLOR EPOXIDE	0.24		9E+00	5.66E+08	1E-11	1E-10	7E-13	6E-12	1E-12	1E-11	1E-12	1E-11
atilization:				**VF**								
RSENIC	92		2E+01									
DIELDRIN	0.16		2E+01	1.23E+06	4E-09	6E-08	2E-10	4E-09	5E-10	7E-09	3E-10	6E-09
HEPTACHLOR	0.53		5E+00	3.48E+04	4E-07	2E-06	3E-08	1E-07	5E-08	2E-07	4E-08	2E-07
HEPTACHLOR EPOXIDE	0.24		9E+00	2.93E+06	2E-09	2E-08	1E-10	1E-09	3E-10	3E-09	2E-10	2E-09
Particle Cancer Risk Totals for Detected Compounds Only:					**Sum =**	**6.9E-08**	**Sum =**	**4.1E-09**	**Sum =**	**8.6E-09**	**Sum =**	**6.5E-09**
Volatile Cancer Risk Totals for Detected Compounds Only:					**Sum =**	**2.0E-06**	**Sum =**	**1.2E-07**	**Sum =**	**2.5E-07**	**Sum =**	**1.9E-07**
Total Cancer Risk via Inhalation (Detected and nondetected compounds):					**Sum =**	**2.1E-06**	**Sum =**	**1.2E-07**	**Sum =**	**2.6E-07**	**Sum =**	**2.0E-07**

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LADD = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.

* Cancer risk exceeds 10E-4.

Table 6. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Inhalation of Volatiles and Fugitive Dust (Subsurface Soil).
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	PEF/VF	Adult Worker LADD	Adult Worker CR	Construction Worker LADD	Construction Worker CR	Youth Visitor LADD	Youth Visitor CR	Child Visitor LADD	Child Visitor CR
Particulate Emission:				PEF								
ARSENIC	27.2		2E+01	5.66E+08	1E-09	2E-08	8E-11	1E-09	2E-10	3E-09	1E-10	2E-09
Volatilization:				VF								
ARSENIC	27.2		2E+01									
Particle Cancer Risk Totals for Detected Compounds Only:					Sum =	2.0E-08	Sum =	1.2E-09	Sum =	2.5E-09	Sum =	1.9E-09
Volatile Cancer Risk Totals for Detected Compounds Only:					Sum =	--	Sum =	--	Sum =	--	Sum =	--
Total Cancer Risk via Inhalation (Detected and nondetected compounds):					Sum =	2.0E-08	Sum =	1.2E-09	Sum =	2.5E-09	Sum =	1.9E-09

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)D = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
ncer risk exceeds 10E-4.

Table 7. Quantitative Risk Assessment - Noncarcinogens
Commercial Use - Dermal Contact/Surface Soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
ARSENIC	92		3E-04	6E-06	2E-02	7E-06	2E-02	8E-06	3E-02	8E-05	3E-01
DIELDRIN	0.16		5E-05	4E-08	7E-04	4E-08	8E-04	4E-08	9E-04	5E-07	9E-03
HEPTACHLOR	0.53		5E-04	1E-07	2E-04	1E-07	3E-04	1E-07	3E-04	2E-06	3E-03
HEPTACHLOR EPOXIDE	0.24		1E-05	5E-08	4E-03	6E-08	5E-03	7E-08	5E-03	7E-07	5E-02
Hazard Index for Detected Compounds Only:				**Sum =**	**2.6E-02**	**Sum =**	**2.9E-02**	**Sum =**	**3.1E-02**	**Sum =**	**3.2E-01**
Hazard Index for Detected and Nondetected Compounds:				**Sum =**	**2.6E-02**	**Sum =**	**2.9E-02**	**Sum =**	**3.1E-02**	**Sum =**	**3.2E-01**

ADD = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.

* Hazard quotient or hazard index exceeds 1.5.

Table 8. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Dermal Contact/Surface soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	92		2E+00	2E-06	3E-06	1E-07	2E-07	1E-06	2E-06	7E-06	1E-05
DIELDRIN	0.16		2E+01	1E-08	2E-07	6E-10	9E-09	7E-09	1E-07	4E-08	6E-07
HEPTACHLOR	0.53		5E+00	4E-08	2E-07	2E-09	9E-09	2E-08	1E-07	1E-07	6E-07
HEPTACHLOR EPOXIDE	0.24		9E+00	2E-08	2E-07	9E-10	8E-09	1E-08	1E-07	6E-08	5E-07
Cancer Risk for Detected Compounds Only:				**Sum =**	**3.9E-06**	**Sum =**	**1.8E-07**	**Sum =**	**2.3E-06**	**Sum =**	**1.2E-05**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**3.9E-06**	**Sum =**	**1.8E-07**	**Sum =**	**2.3E-06**	**Sum =**	**1.2E-05**

LADD = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.

* Cancer risk exceeds 10E-4.

Table 9. Quantitative Risk Assessment - Noncarcinogens
Commercial Use - Dermal Contact/Subsurface Soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
ARSENIC	27.2		3E-04	2E-06	6E-03	2E-06	7E-03	2E-06	7E-03	2E-05	8E-02
Hazard Index for Detected Compounds Only:				Sum =	6.1E-03	Sum =	7.0E-03	Sum =	7.4E-03	Sum =	7.7E-02
Hazard Index for Detected and Nondetected Compounds:				Sum =	6.1E-03	Sum =	7.0E-03	Sum =	7.4E-03	Sum =	7.7E-02

ADD = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.

Hazard quotient or hazard index exceeds 1.5.

Table 10. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Dermal Contact/Subsurface soil.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	27 2		2E+00	7E-07	1E-06	3E-08	4E-08	4E-07	6E-07	2E-06	3E-06
Cancer Risk for Detected Compounds Only:				**Sum =**	**9.8E-07**	**Sum =**	**4.5E-08**	**Sum =**	**5.7E-07**	**Sum =**	**3.0E-06**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**9.8E-07**	**Sum =**	**4.5E-08**	**Sum =**	**5.7E-07**	**Sum =**	**3.0E-06**

D = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
ncer risk exceeds 10E-4.

Table 11. Quantitative Risk Assessment - Noncarcinogenic
Commercial Use - Incidental Ingestion/Sediment.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
ARSENIC	333		3E-04	3E-05	1E-01	3E-04	1E+00	1E-04	4E-01	6E-04	2E+00 *
Hazard Index for Detected Compounds Only:				Sum =	1.1E-01	Sum =	1.1E+00	Sum =	4.0E-01	Sum =	2.1E+00 *
Hazard Index for Detected and Nondetected Compounds:				Sum =	1.1E-01	Sum =	1.1E+00	Sum =	4.0E-01	Sum =	2.1E+00 *

ADD = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.

* Hazard quotient or hazard index exceeds 1.5.

Table 12. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Incidental Ingestion/Sediment.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	333		2E+00	1E-05	2E-05	5E-06	7E-06	2E-05	3E-05	5E-05	8E-05
Cancer Risk for Detected Compounds Only:				**Sum =**	**1.8E-05**	**Sum =**	**7.0E-06**	**Sum =**	**3.0E-05**	**Sum =**	**8.1E-05**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**1.8E-05**	**Sum =**	**7.0E-06**	**Sum =**	**3.0E-05**	**Sum =**	**8.1E-05**

) = lifetime average daily dose (mg/kg/d). CR = Cancer risk Compounds printed in lowercase letters were not detected in any sample.
cer risk exceeds 10E-4.

Table 13. Quantitative Risk Assessment - Carcinoge...

Commercial Use - Inhalation of Volatiles and Fugitive Dust (Sediment).

For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	PEF/VF	Adult Worker LADD	Adult Worker CR	Construction Worker LADD	Construction Worker CR	Youth Visitor LADD	Youth Visitor CR	Child Visitor LADD	Child Visitor CR
culate Emission:				**PEF**								
SENIC	333		2E+01	5.66E+08	3E-09	5E-08	2E-10	3E-09	8E-10	1E-08	6E-10	9E-09
ilization:				**VF**								
SENIC	333		2E+01									
Particle Cancer Risk Totals for Detected Compounds Only:					Sum =	5.2E-08	Sum =	3.1E-09	Sum =	1.2E-08	Sum =	9.3E-09
Volatile Cancer Risk Totals for Detected Compounds Only:					Sum =	--	Sum =	--	Sum =	--	Sum =	--
Total Cancer Risk via Inhalation (Detected and nondetected compounds):					Sum =	5.2E-08	Sum =	3.1E-09	Sum =	1.2E-08	Sum =	9.3E-09

)D = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.

ancer risk exceeds 10E-4.

Table 14. Quantitative Risk Assessment - Noncarcinogenic
Commercial Use - Dermal Contact/Sediment.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
ARSENIC	333		3E-04	5E-06	2E-02	5E-06	2E-02	1E-05	4E-02	1E-04	4E-01
Hazard Index for Detected Compounds Only:				**Sum =**	**1.6E-02**	**Sum =**	**1.8E-02**	**Sum =**	**3.6E-02**	**Sum =**	**3.7E-01**
Hazard Index for Detected and Nondetected Compounds:				**Sum =**	**1.6E-02**	**Sum =**	**1.8E-02**	**Sum =**	**3.6E-02**	**Sum =**	**3.7E-01**

ADD = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.

Hazard quotient or hazard index exceeds 1.5.

Table 15. Quantitative Risk Assessment - Carcinogenic
Commercial Use - Dermal Contact/Sediment.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (mg/kg)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ISENIC	333		2E+00	2E-06	3E-06	8E-08	1E-07	2E-06	3E-06	1E-05	1E-05
Cancer Risk for Detected Compounds Only:				Sum =	2.5E-06	Sum =	1.1E-07	Sum =	2.8E-06	Sum =	1.4E-05
Cancer Risk for Detected and Nondetected Compounds:				Sum =	2.5E-06	Sum =	1.1E-07	Sum =	2.8E-06	Sum =	1.4E-05

DD = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
'ancer risk exceeds 10E-4.

Table 16. Comparison of sediment contaminant concentrations to NOAA ERM values For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Qualifier	Concentration	ERM	Exceeds ERM (Yes/No)
ARSENIC		333	70	Yes
4,4'-DDE	U	0.00285	0.027	No
4,4'-DDT		0.0091	0.0461	No

< or U = compound was not detected, reported concentration represents one half the detection level.
Contaminant concentrations and ERM values are reported in units of mg/kg.

Table 17. Quantitative Risk Assessment - Noncarcinogenic
Industrial Use - Incidental Ingestion/Surface water While Swimming.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (ug/L)	Qualifier	Reference Dose (mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				ADD	HQ	ADD	HQ	ADD	HQ	ADD	HQ
:SENIC	172		3E-04	4E-06	1E-02			7E-06	2E-02	2E-05	6E-02
ırin	0.025	U	3E-05	6E-10	2E-05			1E-09	3E-05	3E-09	9E-05
:ldrin	0.05	U	5E-05	1E-09	2E-05			2E-09	4E-05	5E-09	1E-04
ptachlor	0.025	U	5E-04	6E-10	1E-06			1E-09	2E-06	3E-09	5E-06
ptachlor epoxide	0.025	U	1E-05	6E-10	5E-05			1E-09	8E-05	3E-09	2E-04
Hazard Index for Detected Compounds Only:				**Sum =**	**1.3E-02**	**Sum =**	**--**	**Sum =**	**2.4E-02**	**Sum =**	**6.3E-02**
Hazard Index for Nondetected Compounds Only:				**Sum =**	**8.9E-05**	**Sum =**	**--**	**Sum =**	**1.6E-04**	**Sum =**	**4.2E-04**
Hazard Index for Detected and Nondetected Compounds:				**Sum =**	**1.4E-02**	**Sum =**	**--**	**Sum =**	**2.4E-02**	**Sum =**	**6.3E-02**

D = average daily dose (mg/kg/d). HQ = Hazard Quotient (unitless). Compounds printed in lowercase letters were not detected in any sample.
azard quotient or hazard index exceeds 1.5.

Table 18. Quantitative Risk Assessment - Carcinogenic
Industrial Use - Incidental Ingestion/Surface water While Swimming.
For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

Analyte	Concentration (ug/L)	Qualifier	Slope Factor (1/mg/kg/d)	Adult Worker		Construction Worker		Youth Visitor		Child Visitor	
				LADD	CR	LADD	CR	LADD	CR	LADD	CR
ARSENIC	172		2E+00	2E-06	3E-06			1E-06	2E-06	2E-06	2E-06
aldrin	0.025	U	2E+01	3E-10	4E-09			2E-10	3E-09	2E-10	4E-09
alpha-bhc	0.025	U	6E+00	3E-10	2E-09			2E-10	1E-09	2E-10	1E-09
dieldrin	0.05	U	2E+01	5E-10	8E-09			4E-10	6E-09	5E-10	8E-09
heptachlor	0.025	U	5E+00	3E-10	1E-09			2E-10	8E-10	2E-10	1E-09
heptachlor epoxide	0.025	U	9E+00	3E-10	2E-09			2E-10	2E-09	2E-10	2E-09
toxaphene	2.5	U	1E+00	3E-08	3E-08			2E-08	2E-08	2E-08	3E-08
Cancer Risk for Detected Compounds Only:				**Sum =**	**2.6E-06**	**Sum =**	**--**	**Sum =**	**1.8E-06**	**Sum =**	**2.4E-06**
Cancer Risk for Nondetected Compounds Only:				**Sum =**	**4.5E-08**	**Sum =**	**--**	**Sum =**	**3.2E-08**	**Sum =**	**4.2E-08**
Cancer Risk for Detected and Nondetected Compounds:				**Sum =**	**2.6E-06**	**Sum =**	**--**	**Sum =**	**1.8E-06**	**Sum =**	**2.5E-06**

D = lifetime average daily dose (mg/kg/d). CR = Cancer risk. Compounds printed in lowercase letters were not detected in any sample.
cer risk exceeds 10E-4.

Table 19. Comparison of detected surface water contaminant concentrations to MDE and EPA Freshwater Ambient Water Quality Criteria For Miller Chemical and Fertilizer Company, 2425 Whitford Road Whiteford, Harford County, Maryland.

		Freshwater Criteria				Fish Consumption (Organism only)	
		MDE Aquatic Life Criteria		EPA Water Quality Criteria			
ARSENIC	172	--	--	--	--	--	0.14

a = The toxicicty of certain substances is decreased or increased by hardness or pH. For these substances MDE may modify the criteria at a site; b = The fresh water aquatic life criteria for cyanide apply only to those waters of the State designed as uses III, III-P, IV, or IV-P. In all other waters of the State cyanide acute and chronic aquatic life criteria of 31.3 and 7.3 ug/L, respectively, apply; c = *Insufficient data to develop criteria. Value represents the lowest observed effect level (LOEL).* d = *Proposed criterion;* e = Hardness dependent criteria (100 mg/L CaCO3 used), f = pH dependent criteria, (7.8 pH used), g = Silver has a hardness dependent value as well as different proposed criteria values.

Contaminant concentrations are reported in units of ug/L.

ATTACHMENTS

ATTACHMENT A

Attachment A. Identification of Chemicals of Concern: Miller Chemical and Fertilizer Company, Whiteford, Harford County, Maryland; PCA Code: 65599

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	Adjusted Tap Water RBC		Pass Tier 1 Screen ?	Adjusted Soil RBC (Residential)	Pass Tier 1 Screen ?
Water: Surface water											
Inorganics:											
SW4	ARSENIC	7440382	Water	172		UG/L	4.46E-02	C	Fail	--	--
Organics:											
SW/WP1	4,4'-DDD	72548	Water	0.05	U	UG/L	2.79E-01	C	Pass	--	--
SW/WP3	4,4'-DDE	72559	Water	0.05	U	UG/L	1.97E-01	C	Pass	--	--
SW/WP3	4,4'-DDT	50293	Water	0.05	U	UG/L	1.97E-01	C	Pass	--	--
SW6	ALDRIN	309002	Water	0.025	U	UG/L	3.94E-03	C	Fail	--	--
SW5	ALPHA-BHC	319846	Water	0.025	U	UG/L	1.06E-02	C	Fail	--	--
SW6	ALPHA-CHLORDANE	57749	Water	0.025	U	UG/L	1.91E-01	C	Pass	--	--
SW6	BETA-BHC	319857	Water	0.025	U	UG/L	3.72E-02	C	Pass	--	--
SW6	DELTA-BHC	58899	Water	0.025	U	UG/L	5.15E-02	C	Pass	--	--
SW/WP3	DIELDRIN	60571	Water	0.05	U	UG/L	4.19E-03	C	Fail	--	--
SW5	ENDOSULFAN I	115297	Water	0.025	U	UG/L	2.19E+01	* N	Pass	--	--
SW/WP3	ENDOSULFAN II	115297	Water	0.05	U	UG/L	2.19E+01	* N	Pass	--	--
SW/WP3	ENDOSULFAN SULFATE	115297	Water	0.05	U	UG/L	2.19E+01	* N	Pass	--	--
SW/WP3	ENDRIN	72208	Water	0.05	U	UG/L	1.10E+00	* N	Pass	--	--
SW/WP3	ENDRIN ALDEHYDE	72208	Water	0.05	U	UG/L	1.10E+00	* N	Pass	--	--
SW6	ENDRIN KETONE	72208	Water	0.05	U	UG/L	1.10E+00	* N	Pass	--	--
SW6	GAMMA-BHC (LINDANE)	58899	Water	0.025	U	UG/L	5.15E-02	C	Pass	--	--
SW1	GAMMA-CHLORDANE	57749	Water	0.025	U	UG/L	1.91E-01	C	Pass	--	--
SW6	HEPTACHLOR	76448	Water	0.025	U	UG/L	1.49E-02	C	Fail	--	--
SW6	HEPTACHLOR EPOXIDE	1024573	Water	0.025	U	UG/L	7.36E-03	C	Fail	--	--
SW4	METHOXYCHLOR	72435	Water	0.25	U	UG/L	1.83E+01	* N	Pass	--	--
SW5	TOXAPHENE	8001352	Water	2.5	U	UG/L	6.09E-02	C	Fail	--	--

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	Adjusted Tap Water RBC	Pass Tier 1 Screen ?	Adjusted Soil RBC (Residential)		Pass Tier 1 Screen ?
Soil											
Surface:											
Inorganics:											
S10	ARSENIC	7440382	Soil	92		MG/KG	--	--	4.30E-01	C	Fail
Organics:											
S10	4,4'-DDD	72548	Soil	0.33		mg/kg	--	--	2.70E+00	C	Pass
S10	4,4'-DDE	72559	Soil	0.033	J	mg/kg	--	--	1.90E+00	C	Pass
S4	4,4'-DDT	50293	Soil	0.13		mg/kg	--	--	1.90E+00	C	Pass
S10	ALDRIN	309002	Soil	0.00555	U	mg/kg	--	--	3.80E-02	C	Pass
S10	ALPHA-BHC	319846	Soil	0.00555	U	mg/kg	--	--	1.00E-01	C	Pass
S10	ALPHA-CHLORDANE	57749	Soil	0.054		mg/kg	--	--	1.80E+00	C	Pass
S10	BETA-BHC	319857	Soil	0.00555	U	mg/kg	--	--	3.60E-01	C	Pass
S10	DELTA-BHC	58899	Soil	0.00555	U	mg/kg	--	--	4.90E-01	C	Pass
S11	DIELDRIN	60571	Soil	0.16		mg/kg	--	--	4.00E-02	C	Fail
S10	ENDOSULFAN I	115297	Soil	0.00555	U	mg/kg	--	--	4.70E+01	* N	Pass
S10	ENDOSULFAN II	115297	Soil	0.0108	U	mg/kg	--	--	4.70E+01	* N	Pass
S10	ENDOSULFAN SULFATE	115297	Soil	0.0108	U	mg/kg	--	--	4.70E+01	* N	Pass
S10	ENDRIN	72208	Soil	0.0108	U	mg/kg	--	--	2.40E+00	* N	Pass
S10	ENDRIN ALDEHYDE	72208	Soil	0.0108	U	mg/kg	--	--	2.40E+00	* N	Pass
S10	ENDRIN KETONE	72208	Soil	0.0108	U	mg/kg	--	--	2.40E+00	* N	Pass
S10	GAMMA-BHC (LINDANE)	58899	Soil	0.00555	U	mg/kg	--	--	4.90E-01	C	Pass
S10	GAMMA-CHLORDANE	57749	Soil	0.49		mg/kg	--	--	1.80E+00	C	Pass
S10	HEPTACHLOR	76448	Soil	0.53		mg/kg	--	--	1.40E-01	C	Fail
S10	HEPTACHLOR EPOXIDE	1024573	Soil	0.24		mg/kg	--	--	7.00E-02	C	Fail
S10	METHOXYCHLOR	72435	Soil	0.0555	U	mg/kg	--	--	3.90E+01	* N	Pass
S10	TOXAPHENE	8001352	Soil	0.5565	U	mg/kg	--	--	5.80E-01	C	Pass
Subsurface:											
Inorganics:											
SS10	ARSENIC	7440382	Soil	27.2		MG/KG	--	--	4.30E-01	C	Fail
Organics:											

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	Adjusted Tap Water RBC	Pass Tier 1 Screen ?	Adjusted Soil RBC (Residential)		Pass Tier 1 Screen ?
Soil											
Subsurface:											
Organics:											
SS11	4,4'-DDD	72548	Soil	0.00215	U	mg/kg	--	--	2.70E+00	C	Pass
SS11	4,4'-DDE	72559	Soil	0.00215	U	mg/kg	--	--	1.90E+00	C	Pass
SS11	4,4'-DDT	50293	Soil	0.00215	U	mg/kg	--	--	1.90E+00	C	Pass
SS11	ALDRIN	309002	Soil	0.00115	U	mg/kg	--	--	3.80E-02	C	Pass
SS11	ALPHA-BHC	319846	Soil	0.00115	U	mg/kg	--	--	1.00E-01	C	Pass
SS11	ALPHA-CHLORDANE	57749	Soil	0.00115	U	mg/kg	--	--	1.80E+00	C	Pass
SS11	BETA-BHC	319857	Soil	0.00115	U	mg/kg	--	--	3.60E-01	C	Pass
SS11	DELTA-BHC	58899	Soil	0.00115	U	mg/kg	--	--	4.90E-01	C	Pass
SS3	DIELDRIN	60571	Soil	0.006	U	mg/kg	--	--	4.00E-02	C	Pass
SS11	ENDOSULFAN I	115297	Soil	0.00115	U	mg/kg	--	--	4.70E+01	* N	Pass
SS11	ENDOSULFAN II	115297	Soil	0.00215	U	mg/kg	--	--	4.70E+01	* N	Pass
SS11	ENDOSULFAN SULFATE	115297	Soil	0.00215	U	mg/kg	--	--	4.70E+01	* N	Pass
SS11	ENDRIN	72208	Soil	0.00215	U	mg/kg	--	--	2.40E+00	* N	Pass
SS11	ENDRIN ALDEHYDE	72208	Soil	0.00215	U	mg/kg	--	--	2.40E+00	* N	Pass
SS11	ENDRIN KETONE	72208	Soil	0.00215	U	mg/kg	--	--	2.40E+00	* N	Pass
SS11	GAMMA-BHC (LINDANE)	58899	Soil	0.00115	U	mg/kg	--	--	4.90E-01	C	Pass
SS11	GAMMA-CHLORDANE	57749	Soil	0.00115	U	mg/kg	--	--	1.80E+00	C	Pass
SS11	HEPTACHLOR	76448	Soil	0.00115	U	mg/kg	--	--	1.40E-01	C	Pass
SS11	HEPTACHLOR EPOXIDE	1024573	Soil	0.00115	U	mg/kg	--	--	7.00E-02	C	Pass
SS11	METHOXYCHLOR	72435	Soil	0.0115	U	mg/kg	--	--	3.90E+01	* N	Pass
SS11	TOXAPHENE	8001352	Soil	0.111	U	mg/kg	--	--	5.80E-01	C	Pass

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic, C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	Adjusted Tap Water RBC	Pass Tier 1 Screen ?	Adjusted Soil RBC (Residential)		Pass Tier 1 Screen ?
Sediment											
Inorganics:											
SED4	ARSENIC	7440382	Sediment	333		MG/KG	--	--	4.30E-01	C	Fail
Organics:											
SED5	4,4'-DDD	72548	Sediment	0.00285	U	mg/kg	--	--	2.70E+00	C	Pass
SED5	4,4'-DDE	72559	Sediment	0.00285	U	mg/kg	--	--	1.90E+00	C	Pass
SED5	4,4'-DDT	50293	Sediment	0.0091		mg/kg	--	--	1.90E+00	C	Pass
SED5	ALDRIN	309002	Sediment	0.00145	U	mg/kg	--	--	3.80E-02	C	Pass
SED5	ALPHA-BHC	319846	Sediment	0.00145	U	mg/kg	--	--	1.00E-01	C	Pass
SED5	ALPHA CHLORDANE	57749	Sediment	0.00145	U	mg/kg	--	--	1.80E+00	C	Pass
SED5	BETA-BHC	319857	Sediment	0.00145	U	mg/kg	--	--	3.60E-01	C	Pass
SED5	DELTA-BHC	58899	Sediment	0.00145	U	mg/kg	--	--	4.90E-01	C	Pass
SED5	DIELDRIN	60571	Sediment	0.0076	J	mg/kg	--	--	4.00E-02	C	Pass
SED5	ENDOSULFAN I	115297	Sediment	0.00145	U	mg/kg	--	--	4.70E+01	* N	Pass
SED5	ENDOSULFAN II	115297	Sediment	0.00285	U	mg/kg	--	--	4.70E+01	* N	Pass
SED5	ENDOSULFAN SULFATE	115297	Sediment	0.00285	U	mg/kg	--	--	4.70E+01	* N	Pass
SED5	ENDRIN	72208	Sediment	0.00285	U	mg/kg	--	--	2.40E+00	* N	Pass
SED5	ENDRIN ALDEHYDE	72208	Sediment	0.00285	U	mg/kg	--	--	2.40E+00	* N	Pass
SED5	ENDRIN KETONE	72208	Sediment	0.00285	U	mg/kg	--	--	2.40E+00	* N	Pass
SED5	GAMMA BHC (LINDANE)	58899	Sediment	0.00145	U	mg/kg	--	--	4.90E-01	C	Pass
SED5	GAMMA-CHLORDANE	57749	Sediment	0.0034	J	mg/kg	--	--	1.80E+00	C	Pass
SED5	HEPTACHLOR	76448	Sediment	0.00145	U	mg/kg	--	--	1.40E-01	C	Pass
SEDWP3	HEPTACHLOR EPOXIDE	1024573	Sediment	0.0016	U	mg/kg	--	--	7.00E-02	C	Pass
SED5	METHOXYCHLOR	72435	Sediment	0.0145	U	mg/kg	--	--	3.90E+01	* N	Pass
SED5	TOXAPHENE	8001352	Sediment	0.146	U	mg/kg	--	--	5.80E-01	C	Pass

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury, the screening value was arbitrarily set at 1E-6 for soil and water.

Attachment A. Identification of Chemicals of Concern (Non-Residential Use): Miller Chemical and Fertilizer Company, Whiteford, Harford County, Maryland; PCA Code: 65599

Sample ID	*Analyte*	*CAS*	*Matrix*	*Concentration*	*Qual.*	*Units*	*MDE Groundwater Standard*	*Pass Tier 1 Screen ?*	*MDE Soil Standard (Non-Residential)*	*Pass Tier 1 Screen ?*
Water: Surface water										
Inorganics:										
SW4	ARSENIC	7440382	Water	172		UG/L	5.00E+01	Fail	--	--
Organics:										
SW1	4,4'-DDD	72548	Water	0.05	U	UG/L	2.80E-01	Pass	--	--
SW/WP3	4,4'-DDE	72559	Water	0.05	U	UG/L	2.00E-01	Pass	--	--
SW/WP3	4,4'-DDT	50293	Water	0.05	U	UG/L	2.00E-01	Pass	--	--
SW5	ALDRIN	309002	Water	0.025	U	UG/L	8.00E-02	Pass	--	--
SW5	ALPHA-BHC	319846	Water	0.025	U	UG/L	8.00E-02	Pass	--	--
SW5	ALPHA-CHLORDANE	57749	Water	0.025	U	UG/L	2.00E+00	Pass	--	--
SW5	BETA-BHC	319857	Water	0.025	U	UG/L	8.00E-02	Pass	--	--
SW6	DELTA-BHC	58899	Water	0.025	U	UG/L	2.00E-01	Pass	--	--
SW/WP3	DIELDRIN	60571	Water	0.05	U	UG/L	8.00E-02	Pass	-	--
SW6	ENDOSULFAN I	115297	Water	0.025	U	UG/L	2.20E+01	Pass	--	--
SW/WP3	ENDOSULFAN II	115297	Water	0.05	U	UG/L	2.20E+01	Pass	--	--
SW/WP3	ENDOSULFAN SULFATE	115297	Water	0.05	U	UG/L	2.20E+01	Pass	--	--
SW/WP3	ENDRIN	72208	Water	0.05	U	UG/L	2.00E+00	Pass	--	--
SW/WP3	ENDRIN ALDEHYDE	72208	Water	0.05	U	UG/L	2.00E+00	Pass	--	--
SW/WP3	ENDRIN KETONE	72208	Water	0.05	U	UG/L	2.00E+00	Pass	--	--
SW6	GAMMA-BHC (LINDANE)	58899	Water	0.025	U	UG/L	2.00E-01	Pass	--	--
SW6	GAMMA-CHLORDANE	57749	Water	0.025	U	UG/L	2.00E+00	Pass	--	--
SW6	HEPTACHLOR	76448	Water	0.025	U	UG/L	4.00E-01	Pass	--	--
SW6	HEPTACHLOR EPOXIDE	1024573	Water	0.025	U	UG/L	2.00E-01	Pass	--	-
SW5	METHOXYCHLOR	72435	Water	0.25	U	UG/L	4.00E+01	Pass	--	--
SW4	TOXAPHENE	8001352	Water	2.5	U	UG/L	3.00E+00	Pass	--	--

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Attachment A (cont.). Identification of Chemicals of Concern (Non-Residential Use): Miller Chemical and Fertilizer Company, Whiteford, Harford County, Maryland; PCA Code: 65599

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	MDE Groundwater Standard	Pass Tier 1 Screen ?	MDE Soil Standard (Non-Residential)	Pass Tier 1 Screen ?
Soil										
Surface:										
Inorganics:										
S10	ARSENIC	7440382	Soil	92		MG/KG	--	--	3.80E+00	Fail
Organics:										
S10	4,4'-DDD	72548	Soil	0.33		mg/kg	--	--	2.40E+01	Pass
S10	4,4'-DDE	72559	Soil	0.033	J	mg/kg	--	--	1.70E+01	Pass
S4	4,4'-DDT	50293	Soil	0.13		mg/kg	--	--	1.70E+01	Pass
S10	ALDRIN	309002	Soil	0.00555	U	mg/kg	--	--	3.40E-01	Pass
S10	ALPHA-BHC	319846	Soil	0.00555	U	mg/kg	--	--	9.10E-01	Pass
S10	ALPHA-CHLORDANE	57749	Soil	0.054		mg/kg	--	--	1.60E+01	Pass
S10	BETA-BHC	319857	Soil	0.00555	U	mg/kg	--	--	3.20E+00	Pass
S10	DELTA-BHC	58899	Soil	0.00555	U	mg/kg	--	--	4.40E+00	Pass
S11	DIELDRIN	60571	Soil	0.16		mg/kg	--	--	3.60E-01	Pass
S10	ENDOSULFAN I	115297	Soil	0.00555	U	mg/kg	--	--	1.20E+03	Pass
S10	ENDOSULFAN II	115297	Soil	0.0108	U	mg/kg	--	--	1.20E+03	Pass
S10	ENDOSULFAN SULFATE	115297	Soil	0.0108	U	mg/kg	--	--	1.20E+03	Pass
S10	ENDRIN	72208	Soil	0.0108	U	mg/kg	--	--	6.10E+01	Pass
S10	ENDRIN ALDEHYDE	72208	Soil	0.0108	U	mg/kg	--	--	6.10E+01	Pass
S10	ENDRIN KETONE	72208	Soil	0.0108	U	mg/kg	--	--	6.10E+01	Pass
S10	GAMMA-BHC (LINDANE)	58899	Soil	0.00555	U	mg/kg	--	--	4.40E+00	Pass
S10	GAMMA-CHLORDANE	57749	Soil	0.49		mg/kg	--	--	1.60E+01	Pass
S10	HEPTACHLOR	76448	Soil	0.53		mg/kg	--	--	1.30E+00	Pass
S10	HEPTACHLOR EPOXIDE	1024573	Soil	0.24		mg/kg		--	6.30E-01	Pass
S10	METHOXYCHLOR	72435	Soil	0.0555	U	mg/kg	--	--	1.00E+03	Pass
S10	TOXAPHENE	8001352	Soil	0.5565	U	mg/kg	--	--	5.20E+00	Pass
Subsurface:										
Inorganics:										
SS10	ARSENIC	7440382	Soil	27.2		MG/KG	--	-	3.80E+00	Fail
Organics:										

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	MDE Groundwater Standard	Pass Tier 1 Screen ?	MDE Soil Standard (Non-Residential)	Pass Tier 1 Screen ?
Soil										
Subsurface:										
Organics:										
SS11	4,4'-DDD	72548	Soil	0.00215	U	mg/kg	--	--	2.40E+01	Pass
SS11	4,4'-DDE	72559	Soil	0.00215	U	mg/kg	--	--	1.70E+01	Pass
SS11	4,4'-DDT	50293	Soil	0.00215	U	mg/kg	--	--	1.70E+01	Pass
SS11	ALDRIN	309002	Soil	0.00115	U	mg/kg	--	--	3.40E-01	Pass
SS11	ALPHA-BHC	319846	Soil	0.00115	U	mg/kg	--	--	9.10E-01	Pass
SS11	ALPHA-CHLORDANE	57749	Soil	0.00115	U	mg/kg	--	--	1.60E+01	Pass
SS11	BETA-BHC	319857	Soil	0.00115	U	mg/kg	--	--	3.20E+00	Pass
SS11	DELTA-BHC	58899	Soil	0.00115	U	mg/kg	--	--	4.40E+00	Pass
SS3	DIELDRIN	60571	Soil	0.006	U	mg/kg	--	--	3.60E-01	Pass
SS11	ENDOSULFAN I	115297	Soil	0.00115	U	mg/kg	--	--	1.20E+03	Pass
SS11	ENDOSULFAN II	115297	Soil	0.00215	U	mg/kg	--	--	1.20E+03	Pass
SS11	ENDOSULFAN SULFATE	115297	Soil	0.00215	U	mg/kg	--	--	1.20E+03	Pass
SS11	ENDRIN	72208	Soil	0.00215	U	mg/kg	--	--	6.10E+01	Pass
SS11	ENDRIN ALDEHYDE	72208	Soil	0.00215	U	mg/kg	--	--	6.10E+01	Pass
SS11	ENDRIN KETONE	72208	Soil	0.00215	U	mg/kg	--	--	6.10E+01	Pass
SS11	GAMMA-BHC (LINDANE)	58899	Soil	0.00115	U	mg/kg	--	-	4.40E+00	Pass
SS11	GAMMA-CHLORDANE	57749	Soil	0.00115	U	mg/kg	--	--	1.60E+01	Pass
SS11	HEPTACHLOR	76448	Soil	0.00115	U	mg/kg	--	--	1.30E+00	Pass
SS11	HEPTACHLOR EPOXIDE	1024573	Soil	0.00115	U	mg/kg	--	--	6.30E-01	Pass
SS11	METHOXYCHLOR	72435	Soil	0.0115	U	mg/kg	--	--	1.00E+03	Pass
SS11	TOXAPHENE	8001352	Soil	0.111	U	mg/kg	--	--	5.20E+00	Pass

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

Sample ID	Analyte	CAS	Matrix	Concentration	Qual.	Units	MDE Groundwater Standard	Pass Tier 1 Screen ?	MDE Soil Standard (Non-Residential)	Pass Tier 1 Screen ?
Sediment										
Inorganics:										
SED4	ARSENIC	7440382	Sediment	333		MG KG	--	--	3.80E+00	Fail
Organics:										
SED5	4,4'-DDD	72548	Sediment	0.00285	U	mg/kg	--	--	2.40E+01	Pass
SED5	4,4'-DDE	72559	Sediment	0.00285	U	mg/kg	--	--	1.70E+01	Pass
SED5	4,4'-DDT	50293	Sediment	0.0091		mg/kg	--	--	1.70E+01	Pass
SED5	ALDRIN	309002	Sediment	0.00145	U	mg/kg	--	--	3.40E-01	Pass
SED5	ALPHA-BHC	319846	Sediment	0.00145	U	mg/kg	--	--	9.10E-01	Pass
SED5	ALPHA-CHLORDANE	57749	Sediment	0.00145	U	mg/kg	--	--	1.60E+01	Pass
SED5	BETA-BHC	319857	Sediment	0.00145	U	mg/kg	--	--	3.20E+00	Pass
SED5	DELTA-BHC	58899	Sediment	0.00145	U	mg/kg	--	--	4.40E+00	Pass
SED5	DIELDRIN	60571	Sediment	0.0076	J	mg/kg	--	--	3.60E-01	Pass
SED5	ENDOSULFAN I	115297	Sediment	0.00145	U	mg/kg	--	--	1.20E+03	Pass
SED5	ENDOSULFAN II	115297	Sediment	0.00285	U	mg/kg	--	--	1.20E+03	Pass
SED5	ENDOSULFAN SULFATE	115297	Sediment	0.00285	U	mg/kg	--	--	1.20E+03	Pass
SED5	ENDRIN	72208	Sediment	0.00285	U	mg/kg	--	--	6.10E+01	Pass
SED5	ENDRIN ALDEHYDE	72208	Sediment	0.00285	U	mg/kg	--	--	6.10E+01	Pass
SED5	ENDRIN KETONE	72208	Sediment	0.00285	U	mg/kg	--	--	6.10E+01	Pass
SED5	GAMMA-BHC (LINDANE)	58899	Sediment	0.00145	U	mg/kg	--	--	4.40E+00	Pass
SED5	GAMMA-CHLORDANE	57749	Sediment	0.0034	J	mg/kg	--	--	1.60E+01	Pass
SED5	HEPTACHLOR	76448	Sediment	0.00145	U	mg/kg	--	--	1.30E+00	Pass
SEDWP3	HEPTACHLOR EPOXIDE	1024573	Sediment	0.0016	U	mg/kg	--	--	6.30E-01	Pass
SED5	METHOXYCHLOR	72435	Sediment	0.0145	U	mg/kg	--	--	1.00E+03	Pass
SED5	TOXAPHENE	8001352	Sediment	0.146	U	mg/kg	--	--	5.20E+00	Pass

* RBC adjusted for non-carcinogenic additive effects; N = non-carcinogenic; C = carcinogenic. Note: no RBC value exists for inorganic mercury; the screening value was arbitrarily set at 1E-6 for soil and water.

ATTACHMENT B

DATA ENTRY SHEET

CALCULATE RISK BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SI-SCREEN
Version 2.3, 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (mg/kg)	Chemical
72548	3.90E+00	DDD

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_B (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_T (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type used to estimate soil vapor permeability	ENTER User-defined vadose zone soil air permeability, k_v (cm²)
15	15	13.9	SCL	

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water filled porosity, θ_w (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_oc (unitless)
1.5	0.43	0.3	0.02

MORE ↓

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for non-carcinogens, AT_n (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR	ENTER Target hazard quotient for non-carcinogens, THQ
70	30	25	250	1.0E-06	1

Used to calculate risk-based soil concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS.

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc. (µg/kg)
NA	NA	NA	1.80E+05	NA

INCREMENTAL RISK CALCULATIONS.

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~3.2E-11~~ 1.8×10^{-12}	NA

MESSAGE SUMMARY BELOW

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

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DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATE (enter "X" in "YES" box)

SL SCREEN
Version 2.3, 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., Cs (mg/kg)	Chemical
72548	3.30E+01	DDE

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, Lb (15 or 200 cm)	ENTER Depth below grade to top of contamination, L (cm)	ENTER Average soil temperature, T (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k (cm²)
15	15	13.9	SCL		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρb (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θw (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, foc (unitless)
1.5	0.43	0.3	0.002

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for noncarcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	25	250	1.0E-06	1

Use this to calculate risk-based soil conc.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc carcinogen (ug/kg)	Indoor exposure soil conc noncarcinogen (ug/kg)	Risk-based indoor exposure soil conc (ug/kg)	Soil saturation conc C_{sat} (ug/kg)	Final indoor exposure soil conc (ug/kg)
NA	NA	NA	1.07E+06	NA

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~6.3E-12~~ 3.5E-13	NA

MESSAGE SUMMARY BELOW

MESSAGE Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation

END

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DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SL-SCREEN
Version 2.3, 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil concentration, C_s (mg/kg)	Chemical
50293	1.30E+02	DDT

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	15	13.9	SCL		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_{oc} (unitless)
1.5	0.43	0.1	0.002

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for non-carcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for non-carcinogens, THQ (unitless)
70	25	25	350	1.0E-06	1

Used to calculate risk-based soil concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc (µg/kg)
NA	NA	NA	1.32E+05	NA

MESSAGE SUMMARY BELOW.

END

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~9.2E-12~~ 5.1E-13	NA

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DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATE (enter "X" in "YES" box)

SL-SCREEN
Version 2.3; 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (ug/kg)	Chemical
57-74-9	5.10E+01	Chlordane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type used to estimate soil vapor permeability, k_v	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	15	13.0	SCL		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm^3)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc} (unitless)
1.5	0.43	0.3	0.002

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for non-carcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for non-carcinogens, THQ_n (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc. noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.35E+04	NA

MESSAGE SUMMARY BELOW

END

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~1.1E-09~~ 6.0E-11	~~1.2E-05~~ 2.4 E-06

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DATA ENTRY SHEET1

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SL-SCREEN
Version 2.3, 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_i (µg/kg)	Chemical
60571	1.60E+03	Dieldrin

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	15	13.9	SCL		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_{oc} (unitless)
1.5	0.43	0.3	0.002

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for non-carcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for non-carcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc. noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc. (µg/kg)
NA	NA	NA	8.39E+03	NA

MESSAGE SUMMARY BELOW

END

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~1.0E-07~~ 1.0E-8	NA

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DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SL SCREEN
Version 2.3, 03/01

YES	

OR

CALCULATE INCREMENTAL RISK FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
57749	4.90E+02	Chlordane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability, k_v)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	15	13.9	SCL		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water filled porosity, θ_w (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_{oc} (unitless)
1.5	0.43	0.3	0.002

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for non-carcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for non-carcinogens, THQ_g (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil conc. only

END

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RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc carcinogen (ug/kg)	Indoor exposure soil conc noncarcinogen (ug/kg)	Risk-based indoor exposure soil conc. (ug/kg)	Soil saturation conc., C_{sat} (ug/kg)	Final indoor exposure soil conc (ug/kg)
NA	NA	NA	1.35E+04	NA

MESSAGE SUMMARY BELOW

END

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air noncarcinogen (unitless)
~~9.6E-09~~ 5.4 E-10	~~3.9E-01~~ 22 E-05

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DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SL SCREEN
Version 2.3, 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., Csi (µg/kg)	Chemical
76119	5.30E+02	Heptachlor

MORE ↓	ENTER Depth below grade to bottom of enclosed space floor, Lb (15 or 200 cm)	ENTER Depth below grade to top of contamination, Lt (cm)	ENTER Average soil temperature, Ts (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k (cm²)
	15	15	13.9	SCL		

MORE ↓	ENTER Vadose zone soil dry bulk density, ρb (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θw (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, foc (unitless)
	1.5	0.43	0.3	0.002

MORE ↓	ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for noncarcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
	70	25	25	250	1.0E-06	1

User to calculate risk based SSL concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc (mg/kg)
NA	NA	NA	5.08E+05	NA

MESSAGE SUMMARY BELOW

END

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
~~2.1E-07~~ 1.6 E-08	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SL-SCREEN
Version 2.3; 03.01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil concentration, C_s (ug/kg)	Chemical
1024573	2.40E+02	Heptachlor epoxide

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_f (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_s (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	15	13.9	S		

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b (g/cm³)	ENTER Vadose zone soil total porosity, n (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_{oc} (unitless)
1.5	0.43	0.3	0.02

MORE ↓

ENTER Averaging time for carcinogens, AT (yrs)	ENTER Averaging time for non-carcinogens, AT (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for non-carcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

User to calculate soil gas and soil concentration

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS

Indoor exposure soil conc *carcinogen* (µg/kg)	Indoor exposure soil conc. *noncarcinogen* (µg/kg)	Risk-based indoor exposure soil *conc.* (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil *conc* (µg/kg)
NA	NA	NA	3.33E+04	NA

INCREMENTAL RISK CALCULATIONS

Incremental risk from vapor intrusion to indoor air, *carcinogen* (unitless)	Hazard quotient from vapor intrusion to indoor air *noncarcinogen* (unitless)
1.6E-09	NA

MESSAGE SUMMARY BELOW

END

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